THE PROTECTION OF PUBLIC BUILDINGS FROM LIGHTNING.

By KILLINGWORTH HEDGES, M.Inst.C.E.

Read before the Royal Institute of British Architects, Monday, 23rd April 1900.

I HAD the honour of reading a Paper before your Institute in 1884 on "The Fire Risks of Electric Lighting," and of pointing out the possible dangers of introducing electricity into houses unless precautions were taken to prevent energy in the form of heat being generated in the wrong place through bad joints or loose connections, and the necessity of employing conductors of sufficient area, lest their overheating might also cause a fire. Owing to the very complete rules of the different insurance offices and of the Institution of Electrical Engineers, the actual risk from the first cause is almost a negligeable quantity if these rules are strictly adhered to, and with suitable conductors excess current is entirely prevented by the use of the safety fuse, which Mr. Edison in America, and I think I may also take some credit to myself, brought into notice in the very early days of electric lighting.

Shortly before I had the pleasure of last meeting you, a very interesting Paper was brought before the Institute, on January 21st, 1884, by Colonel the Hon. Arthur Parnell, entitled "The Action of Lightning Strokes in regard to the Metals and Chimneys of Buildings." The author carefully analysed many disasters occurring to buildings fitted with lightning-rods, and showed that there were 828 separate instances of mechanical force exercised on various substances as against only 228 of heat. I quote the following extract: "Most persons would doubtless imagine that dry woodwork was more likely to be charred or burnt than to be forcibly rent without a mark of scorching; but the reverse is the case. Also in respect of metals, few would believe that this agency was more apt to break or bend metals than to fuse them, but this is the fact. In regard to the direction of the mechanical force on 34 per cent. of the incidents, evidence is furnished of a more or less upward direction."

Without desiring to endorse the whole of Colonel Parnell's suggestions as to the means of protection to be adopted, I wish to place on record that he was probably the first to state that a metal rod run up the most prominent portion of a building offers a very small protection to the whole structure, and if one turns to the more recent Paper of Dr. Oliver Lodge, F.R.S., which was read before the Institution of Electrical Engineers on April 25th, 1889, it will be seen that the Professor states "that the problem does not end with the actual rod, as the current passing through it at the instance of a flash is so enormous that a very high difference of potential exists between the conductor and the earth, however well the two are connected; hence great circumspection must be exercised as to what metallic conductors are brought near or into contact with it. If one end of a rain-water gutter is attached to a struck lightning

conductor, the other end is almost certain to spit off a long spark unless it is also metallically connected to earth."

Also Professor Kirchoff, of Berlin, writes:* "The mechanical effect of an electrical discharge is greatest where the electric fluid springs from one body to another. Where the lightning leaves the conductor its mechanical effect is again exerted, so that the rod is torn, melted, or bent."

The report of the Lightning-rod Conference, printed in 1882, includes, besides the very useful rules which have been more or less adopted throughout this country up to the present time, also a history of disasters of all kinds occasioned by lightning. Unfortunately for those who, like myself, have been studying the question, there is no official report on the effect of lightning strokes on buildings protected by conductors since those published by the Conference. It is with a view of hearing the valued opinions of the members of the Institute, who, in their capacity as architects, have more opportunity of being practically acquainted with the subject than engineers, that I have brought this Paper before you this evening.

Before commenting on what might be termed "The Art of Protecting Buildings," a short digression may be allowed on the subject of the thunder-cloud.

For a definition of the phenomenon I have turned to an old Encyclopædia of 1820. "Lightning, a bright and vivid flash of fire suddenly appearing in the atmosphere, and commonly disappearing in an instant, sometimes attended with clouds and thunder and sometimes not." It has been the custom, in even modern times, to illustrate a flash of forked lightning by zigzag strokes, which appear to be darting out of the heavens in all directions towards the doomed ship as it heaves on the billows. Curiously enough, the ancients do not appear to have represented the actual flash, but to have made thunder and lightning an attribute of the gods: thus Jove's thunderbolts are often mentioned and usually depicted by the old masters as darts held in the hand ready to be hurled. At the Dorian Palace, Genoa, instead of these being of the usual form, they are more like rods surrounded throughout their length with lambent tongues of fire. In the time of the Romans lightning was much observed in augury, and was a good or bad omen according to the circumstances attending it. Persons killed by lightning, being thought hateful to the gods, were buried apart by themselves, lest the ashes of other men should receive pollution from them. It is said that they were generally buried where they fell, probably from the reason now universally accepted that decomposition sets in very quickly in the bodies of those killed by lightning, even preventing, in case of sheep or oxen, their carcasses being dressed for market. The Romans had also the good sense to avoid places struck by lightning, which were often fenced in, so that no one could use the houses on which Jove had set the mark of his displeasure. To this day the same buildings are struck from time to time, and certain localities are visited by thunderstorms more than others. This knowledge is taken advantage of by the witch-doctors of South Africa, who are said to stand fearlessly on a certain spot during a terrific storm; in the immediate vicinity it would probably be very dangerous to do so, because the large amount of minerals in the rocks might concentrate the lightning discharges.

In parts of Natal the author is informed that thunderstorms are, during certain months, of daily occurrence and extremely violent; the natives will not pasture their cattle in some districts, accidents being of such frequent occurrence. A photograph appeared in one of the magazines a short time ago showing about twenty oxen lying dead along the line of an iron wire fence, thus practically illustrating what is one of the objects of this Paper—to bring

* Quoted in the *Building News*, 10th September 1880.

before the Institute the surging effect of a lightning flash, which may cause great damage. That these cattle were killed by a side-flash from the line of the fence may be inferred from an incident mentioned at the discussion on Lightning Conductors before the British Association in 1888. A number of horses placed in a row were struck by a lightning discharge, the first and the last of the row being killed, while the others were not touched; and people who at a lecture sit in a row holding hands and experience a shock from a Leyden jar, always state that the two end persons feel the shock much more than those in the middle.

Our lightning conductors, as usually now arranged, do not guard against what Dr. Lodge has termed "the spitting action" at all; they may act very well as taps to discharge or quietly pass off on to the atmosphere the "induced electricity from the earth and from the buildings upon it," but as lightning protectors they are so arranged that, if actually struck by a flash, besides damage to the conductor the building would, in all probability, be set on fire, and there is every chance that a portion of the electric current would be diverted into unearthed metalwork, and in its tortuous course to earth would be very destructive. For instance, at Brussels a bar of metal, totally disconnected from anything, not pretending to lead to earth, and being some little distance below a lightning conductor, not offering itself to be struck, as a matter of fact was struck and a slight fire caused.*

We have only to turn to the examples quoted in Colonel Parnell's Paper, which are mainly those collated by the Lightning-Rod Conference, to see that the whole report was bristling with failures of lightning-rods; and the sooner we get rid of the popular fallacy that a properly constructed lightning-rod never fails, our public buildings will be placed in a better state of protection.

During thunderstorms the atmosphere and all conducting objects in the immediate neighbourhood become charged with electricity at a constantly increasing potential or intensity as we recede from the earth. It is stated that at the top of the Washington Monument a potential of 3,000 volts has been measured, and at the top of the Eiffel Tower 10,000 volts. Even objects directly on the earth, such as railroad tracks, high fences, &c., become charged, and in the high altitudes of the west of the United States wet rocks frequently show signs of electrostatic charge. All such charged objects will spark, and the author has, on the high plateaux of Colorado, frequently drawn sparks from even the posts and rails used for fencing.

The characteristics of a flash of lightning which more particularly concern us are: (1) Surging; that is due to the oscillatory character of the spark, which, unlike the currents employed for conveying electricity to a distance for lighting cities or driving tramcars, is a disruptive discharge, sudden and violent, more like the blow of a hammer. (2) Self-induction, a property which gives rise to counter force or choking effect, noticeable in straight wires, but which is much more pronounced in coils of wire. (3) Side-flash, the result of self-induction. A disruptive discharge will often leave what would ordinarily be called an excellent conductor, and side-flash through the air to other much worse conductors; for instance, the lightning-rod may be struck, but, instead of following the course provided, a side-flash may select its own path through a wall of brick or stone, to a neighbouring gas-pipe or bell-wire. The often-quoted example of this danger is the accident at All Saints' Church, Nottingham, about 1870, when the discharge passed from the lightning conductor through a solid wall of masonry four and a half feet thick to a gaspipe.

Electric induction takes a prominent part during a thunderstorm, and it is this which determines whether a disruptive discharge takes place between a cloud and the earth, or between two clouds or layers of a cloud.

* See *Bulletin de la Societé Belge d'Electriciens*, 1888.

In the following diagram (fig. 1), C represents a highly positively electrified storm-cloud when it comes within a certain distance of the earth, E, which distance has been estimated by different authorities from 1,000 to 20,000 feet; it causes, by induction acting through the vapour, particles A of the intervening air, the earth beneath, and everything thereon to become intensely negatively electrified, the area of the earth which is thus electrified by induction being approximately the same as the area of the clouds in which the electricity is greatly accumulated. When the attraction between the positive electricity of a cloud or clouds and

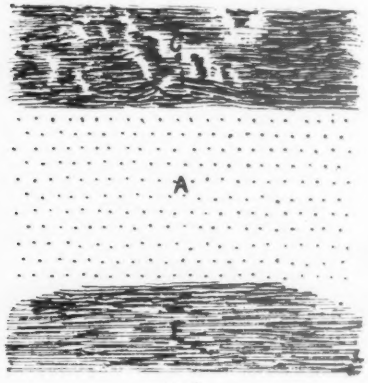


FIG. 1.

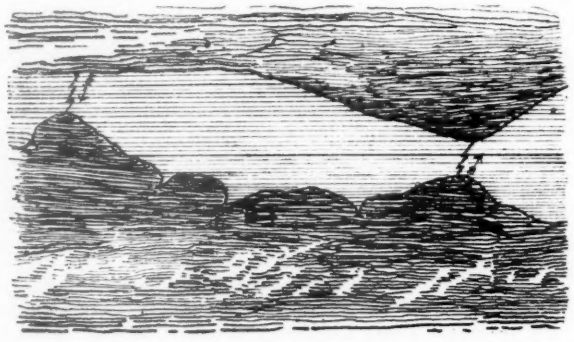


FIG. 2.

the negative electricity of the earth, or *vice versâ*, is able to overcome the resistance offered by the intervening air, a discharge takes place and equilibrium is restored. According to Mr. Spang, whose diagram is now produced, when a downward discharge occurs at one point, through the power of electric induction at another point which may be several miles away, a corresponding discharge occurs in the reverse direction, as shown (fig. 2).

In confirmation of this supposition, I may say that frequently on the plains of Colorado, during the thunderstorm which is of daily occurrence during certain months of the year, I have seen a flash arising from the ground very much as shown in the diagram fig. 2.

ST. PAUL'S CATHEDRAL.

Time will not allow us to follow this subject. The question which interests us at the present time is: Are our public buildings efficiently protected? Several have lately come under the notice of the author, but it will be perhaps sufficient to review the methods formerly adopted for the protection of St. Paul's Cathedral. In 1898 the author was asked to report on the condition of the lightning conductors, which were, he was informed, put up in the year 1872, having taken the place of the original system, erected under the advice of the Royal Society about 144 years ago. The new series were considered at the time as examples of the most advanced system of protecting our national cathedral from disaster from lightning: the spire of old St. Paul's having been partially damaged from this cause three times, at last it was set on fire in the reign of Elizabeth, in 1561, and totally destroyed. It is interesting to note that the Lightning Rod Committee, which was formed in 1875, among whose members were delegates from the Royal Institute of British Architects, appears to owe its formation to inquiries made by the Dean and Chapter of St. Paul's.

EXTRACT FROM THE REPORT.

'The conductors throughout are of ½-inch stranded copper. Four such conductors pass from the iron supports of the cross, down the outside of the dome, branching off into eight conductors, which are cross-connected by the railing of the gallery, and lower down again are united together, the eight conductors being carried down to the ground, as indicated on the accompanying plan. Each tower has two conductors, with a cross connection, the four conductors being carried to earth as shown. There is also a single conductor which passes over the ridge of the choir to an earth on either side.

"The above system was no doubt considered to be an efficient one at the time the work was carried out, but, according to more modern ideas, it is open to serious criticism, and I would call attention to the following points :—

"*Dome.*—(1) In metallic connection with the cross there are several iron straps passing down inside to the level of the gallery, where the ends apparently disappear in the stonework. This, in my opinion, in conjunction with the fact that the four conductors do not appear to be soldered to the iron supports of the cross, is a source of danger, as the electric discharge is liable to pass down these iron straps and discharge through the stonework with disastrous result.

"*Statues.*—(2) The statues on the three sides of the building are not protected.

"*Choir.*—(3) The conductor over the east end of the building affords little protection, as it crosses the roof some twenty feet from the end and has no projecting point of any kind.

"*Towers.*—(4) In view of the great mass of metal in the towers, I do not think the present conductors are sufficient.

"*Earths.*—(5) As regards the earth connections, the conductors were originally laid in a brick sewer passing round the building, now unused, but alterations have since been made, the conductors being either inserted in or outside the earthenware pipes laid in the brick sewer, and in nearly every case quite insulated from the earth [fig. 3]."

Tests were made of the resistance of the so-called earths, and actual measurements were given. A later examination showed that the cables do not make good electrical connection with the iron framework of the ball and cross, but are connected to a circular piece of cable which has been led round the ball, and from this the actual conductors descend until they meet the system previously described as lying on the dome.

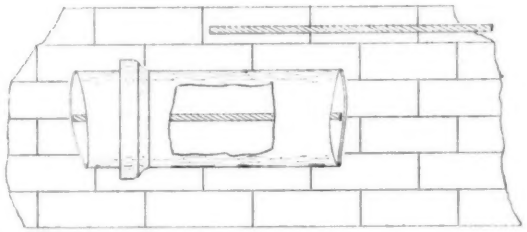


FIG. 3.—PLAN OF OLD CONDUIT, SHOWING EARTHENWARE DRAIN, IN WHICH CONDUCTORS WERE DISCOVERED.

The joints were in every case simply wrapped and unsoldered, consequently they had become in many instances quite loose, and almost everywhere the electrical connection would be of high resistance by reason of the oxidation of the copper. The work had evidently been executed with care, as the ends of the cable forming the earths, when the drain round the structure was in use, were probably always kept in running water, and the insertion of these ends into or around the drain pipes was carried out at a much later date. Generally this installation may be considered an average specimen of the method adopted for protecting our public buildings; if, since these installations were made, the joints have not been renewed and earths carefully tested, the coefficient of safety has probably greatly diminished, and although one sees the usual array of rods, spikes, and so-called conductors, their utility as electrical appliances is practically *nil*. The reason we do not hear of more disasters is partly due to good luck, and also to the fact that most of these buildings are in large towns, and the warm

air ascending from the numerous chimneys in the vicinity helps to lessen the violence of thunderstorms; but should a direct flash strike an insufficiently protected edifice a disaster may occur, similar to the accident at Rockliffe Church in Cumberland, where about fifty feet of steeple was destroyed in a thunderstorm last November.*

Before proceeding to describe the methods adopted by the author for the better protection of St. Paul's, it is proposed to give a short account of Continental practice and to refer to some of the installations which the author has recently visited.

NOTRE-DAME CATHEDRAL, PARIS.

The main conductors are three in number; each of the two on the towers commences at massive wrought-iron terminal rods, say about 20 feet high, 4 inches square at base; to this a solid iron rod, about 1 inch square, is secured by straps and run in lengths jointed at intervals over the roof and outside the tower to the ground, being supported about 7 inches from the lead roof and stonework by stanchions, insulated by half-round stone or porcelain insulators secured by shackles. At some later period, probably during the restoration of 1866, a copper strip had been connected to each of the conductors at the roof and run independently to the ground below. The spire has an elaborate finial with numerous points, and this appears to be connected to earth in the manner previously described, also to the crest which runs along the ridge of the roof.

The method of protection is now a source of danger; a flash received by one of the main rods has two paths open, one by the high-resistance old iron conductor, and a second by the new copper band; the current is prevented from dispersing over the lead roof by the insulators of the conductors; therefore the resistance of the joints (probably very high) will cause it to side-flash from the central rod to the small copper band, and that portion which passes down the iron rod will have this surging or jumping tendency increased by self-induction and the proximity of the better conductor, the copper band. It is assumed that the latter has a good earth connection; if this is not so, the magnitude of the damage will be very much enhanced.

COLOGNE CATHEDRAL.

The protection of this celebrated edifice is far more advanced than that just noticed; in fact, from the cursory inspection made by the author, the work seemed to be very carefully executed, and of a design which might be followed with safety. Stranded copper cables are used, and these invariably run through galvanised-iron stanchions with flat feet, by which they are bolted to the stonework: to avoid galvanic action setting up between the iron and copper, the eyes of these supports are bushed with lead; they keep the conductor about 7 inches away from the structure, or sufficient to enable the cable to be stretched tight and not run round projections in the manner we are accustomed to see here: for this purpose there are tightening screws at several points. A somewhat similar arrangement is used for the horizontal conductors, which run each side of the roof, being kept well away from it.

* Rockliffe Church, struck 7th November 1899. The lightning appears to have struck the steeple close to its base; it rested on a tower 50 feet high, and itself was about 50 feet. The masonry toppled over on to the roof of the nave, which is high pitched and covered with Westmorland green slates. The bulk of the *débris* fell through the roof and caused a pile about 20 feet square, 10 feet high. The two stained-glass lights at the entrance were forced out by the shock or compression of the air. Stones were hurled to a great distance; one was found on the roof of a house 100 yards away. The lightning also struck the iron railings on the west side of the churchyard, and destroyed the boundary wall. The spire cost £1,000 to erect, and the damage to the rest of the church was estimated at £1,000. An old out-of date lightning rod was run up the steeple.

The terminals of the lightning rods are almost always plain spikes, without branches; but a building has many of these, both on the highest portions and along either the tops of the walls or ridge of roof, the whole being connected together by the horizontal conductor, which is usually run in the method described. A timber shed near Frankfort had these vertical rods about 15 feet apart; and a petroleum storage tank at intervals all round its circumference.

THE PALAIS DE JUSTICE, BRUSSELS.

Through the courtesy of the architect, M. Engels, I had an opportunity of inspecting this magnificent structure, and also obtaining information of the most recent adaptation of the system invented by the late Professor Melsen.

It is hardly necessary to go into the details of the installation at the Palais de Justice, as it is very similar to that at the Hôtel de Ville, which has been described in the text-books. Briefly, the Melsen system consists of a network of metal rods connected together at the top and furnished with an aigrette or bundle of eight 4 mm. copper rods spread out like a feather, so that after passing along the roof the terminal points project so little that they can hardly be seen from below, but yet break up the area of the building so as to leave little space unprotected. Copper is used for the conductors; but where they descend, a special iron box is employed, in which they are embedded in zinc, and from this the down rods can be continued in iron and also connected to the rain-water pipes and other ironwork of the building. The provision for earth connection is very ample in the case of the Hôtel de Ville. There are twenty-four iron rods two-fifths of an inch in diameter; of these eight are fastened to the spigot of an iron pipe two feet in diameter, which is suspended in a well in the courtyard; another third is connected with one of the principal iron mains of the water supply of the town; and the remaining series are taken in a similar way to a large iron gas main.

That the earth connection is efficient may be gathered from the fact that the Palais de Justice was struck soon after completion, and that no more damage was done than the partial fusion of some of the points of the aigrette which received the flash.

The Melsen system has been used to a certain extent for the protection of the public buildings in Paris; but French architects seem to prefer the long single point, probably because it is more easily adapted to the elaborate weather vanes and finials which are so largely used, presumably for the embellishment of buildings of importance. The standard rod or *tige* is 6 mètres high; the diameter at base about 0·060 mètre, tapering to nothing at the point; the rod is firmly connected with the woodwork of the roof as shown in the diagram [fig. 4]; and the copper or iron conductor is fixed at the base by means of a shackle. The conductor is usually kept away from the building by means of supports, and is very carefully led into moist earth, or, in the case where the foundation is of rock, connected to a network of wires which run for a very considerable distance under the surface, with the idea of obtaining as large an area as possible.

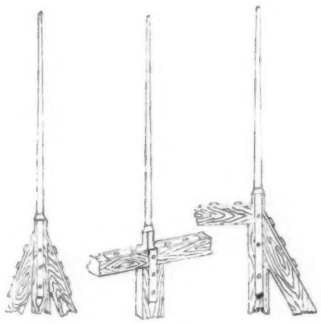


FIG. 4.—POINTS, SHOWING CONNECTION TO TIMBERING. FRENCH METHOD.

FIG. 5.—BASKET EARTH, USED IN WELLS. FRENCH METHOD.

Where a well can be used, the earth connection is prepared by plaiting up galvanised-

iron strips so as to form a basket, which contains a sort of grapnel attached to the conductor, the basket being filled with coke and lowered into the water (see fig. 5).

AMERICAN PRACTICE.

The "lightning-rod man" is well known to all settlers out West, and his pertinacity in introducing his wares has made his profession a synonym for "smartness." As a rule the protection afforded is very small. When the author was engaged in railway engineering in the United States he often found the end of the wrought-iron rod to be simply driven a short distance below the surface of the ground, without any attempt to make a good earth connection; but unfortunately, in one case, the investigation was not made until his office had been set on fire, and the insurance company disputed the claim on the ground that "the risks from lightning were not included in the policy." Now in most cities a much better method is adopted. A round iron rod about half an inch in diameter extends from the ridge of the metal roof about four feet above the top of the chimney or other elevated projection; its lower end is connected to a piece of iron in the form of a saddle, which is soldered to the metal roof; to this also is joined the top of each rain pipe, or, where the gutters are below the roof, special tinned-iron straps connect the two. The rain-water pipes have to be tightly fitted together, and it is said that each pipe 4 in. diameter is equal in capacity to an iron rod $\frac{9}{16}$ in. diameter. The connection between the pipe and the earth is made as follows: Above the elbow portion a galvanised socket is fitted, and to this is soldered a flat bar which is led directly to the nearest water pipe or to the earth. The form which seems to give the best results is constructed of a pipe driven into the ground so that its perforated end rests in moist earth; its upper end is left about six inches below the surface, thus it can be watered artificially or by the rain. To assist the collection of moisture a larger sleeve is placed outside furnished with a perforated top and set flush with the gutter. With slate or wooden roofs, bands of tin plate or galvanised iron are often placed underneath the slate covering and laid on the rafters of the roof, being connected at the top with the "air terminal" conductors, and below with the gutters and rain-water pipes as previously described; in the case of a Mansard roof the sheet metal or flushing is also connected to the system. It is stated that if all the connections are properly made, so as to secure good electrical connection between themselves, the rain-water pipes, and the earth, there is no liability whatever of the woodwork or other material about the roof being set on fire or damaged, or any person beneath the roof being injured by the electricity in a lightning discharge while passing through the combination on its way to earth.

THE REARRANGEMENT OF CONDUCTORS AT ST. PAUL'S CATHEDRAL.

The plan recommended by the author, taking into consideration the large amount of copper cable already disposed about the building, was, first, to run three new cables from the metal-work of the framework supporting the cross to the roof of the dome (making interconnection with the iron supports of the structure); there connecting them with the eight existing conductors, and reuniting them at the base of the dome to the existing system, which is increased by running a new half-inch seven-ply copper cable on the top of the parapet entirely round the building. From this horizontal conductor, aigrettes, consisting of five pointed copper rods, were teed at intervals by means of special brass boxes tinned inside, into which the cable was placed, the aigrettes first secured by binding, and the whole united by running in hard solder. Wherever practicable, this method of uniting the conductors would be adopted, and boxes were prepared suitable for crossings of almost any angle. However, in

consequence of the exposed position, and the rule against open fires or blow-flame lamps, many of the joints have to be made by soldering, this method not possessing the advantage of poured joints, as in course of time, no matter how intimate the surfaces are, oxidation is sure to take place.

Great difficulty was found in securing efficient new earths. Two sets of conductors were, one, united to the hydraulic main supplying power to the organ, and the other to the 8-inch water main; this joint was made by cleaning the outside, then wrapping the strands of the conductor around it, enclosing the whole with a metallic clamp, which was filled with molten lead and screwed up tight.

The present cathedral is surrounded by the foundations of the previous structure, so that not only is the ground very dry, but it is difficult to make a small excavation through the *débris*.

The perforated wrought-iron pipe [fig. 6], furnished with a steel shoe, was, after some trials, sunk to the requisite depth to secure moist ground; the stranded conductor was dropped in the pipe, being soldered to the cap at top, and shielded from injurious electrolytic action by wrapping it in a lead tube. The pipe has a bend at the upper end which projects above

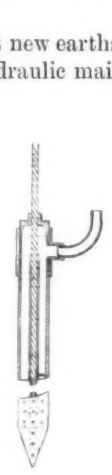


FIG. 6.—TUBE EARTH WITH CONDUCTOR.

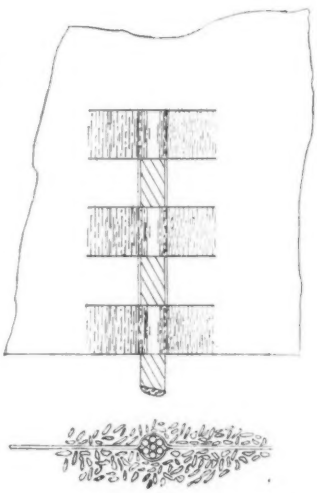


FIG. 7.—PLAN AND SECTION OF EARTH PLATE SHOWING CONNECTION TO COPPER CABLE.

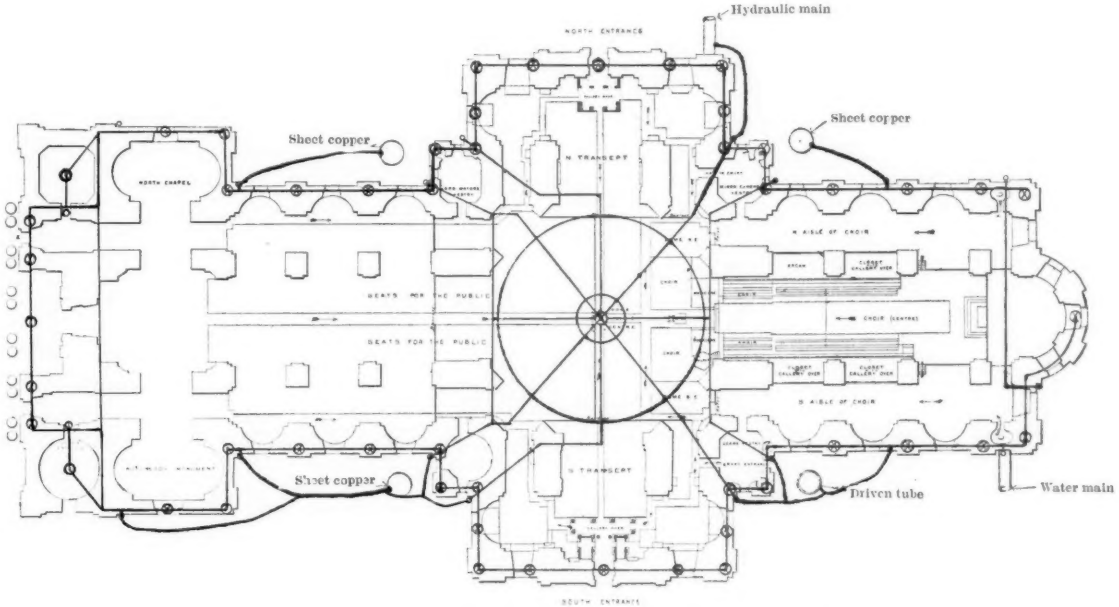


FIG. 8.—PLAN SHOWING THE LIGHTNING-CONDUCTOR INSTALLATION AT ST. PAUL'S.

ground, and is closed by a plug so that water can be poured down. There are other earths of ordinary copper plate buried in a mixture of charcoal and broken electric light carbons [fig. 7], and the old system of conductors is also attached to all these new earths; and it is also proposed to establish connection with the ends of the rain-water pipes, where they look out of the stone wells down which all the conductors are led. The general arrangement is shown on the plan [fig. 8].

The installation should not be taken as a model one, except perhaps with reference to similar ecclesiastical structures, which do not lend themselves very readily to the improved methods of protection, such as the author would recommend for all new public buildings. It is almost impossible to draw up a set of rules to be universally applicable; each building should be carefully studied, first, as regards its position with neighbouring structures; secondly, as to the disposition of the metal employed; and, thirdly, with reference to the subsoil and its suitability for earthing the conductors.

PRACTICAL QUESTIONS.

The author will conclude this Paper in the same way as that read by Professor Oliver Lodge before the Institution of Electrical Engineers in 1889, and reproduce some of the statements made at the time, with further suggestions of his own, with the view of elucidating what improvements in the erection and testing of lightning conductors are possible.

1. (*Prof. Lodge*).—All parts of a lightning conductor, from points to roots, should be of one and the same metal, to avoid voltaic action.

2. (*L.*).—Joints should be avoided when possible, and should be made substantially where necessary; sharp bends and roundabout paths to earth should be avoided as far as possible. A conductor detached from the building is safer than one in close contact with it.

3. (*Author*).—The conductors should be kept a short distance outside the building, by means of supports; these must not be insulated. If joints are necessary, the stranded wires must be spliced and soldered. Tee and other connections, also the union of air terminals or aigrettes to the cable, should be made by splicing or carefully binding, and then protecting the joint by a metal box, which is to be filled with hard solder.

4. (*L.*).—Liability to be deflagrated by a powerful flash determines the minimum allowance for size of cross-section.

5. (*A.*).—It is better to have a standard size throughout, and a cable of sufficient area to withstand rough usage; also the wires or strands should not be too small or they may become brittle with age. A solid conductor may be used, but not a tubular section.

6. (*L.*).—The use of copper is a needless extravagance; iron is as good.

7. (*A.*).—Lightning conductors are costly to renew: iron perishes quickly, copper very slowly; therefore use the latter. Rod is better than flat ribbon, but a stranded conductor is more convenient.

8. (*L.*).—It is not wise to erect very tall pointed rods above the roof of a building; a number of points above the ridge is better than only a few. Any part of a building is liable to be struck; and, to make quite secure, every prominent part of the outside should have a rod running along it.

8[1]. (*A.*).—This horizontal conductor should be furnished with air terminals, preferably in the form of fleur-de-lys or aigrettes at distances proportional to the area to be protected. The terminals should be well pointed, but need not be plated or tipped.

9. (*L.*).—The orthodox rule "Connect all pieces of metal to the lightning conductor"

requires modification, thus: "Connect all pieces of metal to each other and to the earth, but not to the lightning conductor."

9[1]. (*A.*).—Earth all rain-water pipes, gutters, &c., independently of the lightning conductor.

10. (*L.*).—A good and deep earth should be provided independent of gas and water mains, but if the conductor at any part of its course goes near gas or water mains, it is best to connect to them. Where gas and water mains come near each other, it is best to connect them together metallically.

10[1]. (*A.*).—Take care before connecting to water and gas mains that they have leaded, flanged, or screwed joints, and not caulked with red lead and oakum; also avoid the neighbourhood of small-bore fusible gas-pipes, and indoor gas-pipes in general.

11. (*A.*).—After selecting a suitable place for the earth plate or earthed tube, arrange for keeping it moist either by watering or causing a rain-water pipe to discharge in the neighbourhood.

12. (*A.*).—Protect the metallic conductor where it leaves the ground, both from accidental or malicious injury, and from the natural deterioration which will in time take place.

13. (*A.*).—Protect all flagstaffs by a conductor projecting a few inches above the top; if the pole is on a metallic roof this should also be connected to earth.

14. (*A.*).—Test at intervals not greater than one year.

In conclusion I would warn those who have to specify the method of protection to be adopted not to put any faith in the generally received opinion "that a certain space contiguous to a lightning rod is completely protected by it; so that if the rod is raised high enough, a building in this protected region is safe." There is nothing more illusory, as there is no space near a rod which can be definitely styled an area of protection, for it is possible to receive violent sparks or shocks from the conductor itself, not taking into account the phenomena which I have endeavoured to explain under the head of Surging and Self-induction. The best that can be said in favour of the present system of lightning conductors is that they afford incomplete protection, and are far from being efficient; fortunately they are generally ignored by the thunderstorms, otherwise more interest would be taken, and you would not simply insert at the end of your specifications the words "Provide a proper lightning conductor," as if, as the author of the last Paper on this subject remarks, "a lightning conductor was a sort of fetish charm or quack specific warranted to cure all thunderstorm plagues."

I trust that you who are so experienced in these matters will consider the facts and suggestions I have brought forward as objects worthy of attention and further inquiry.

*** The Paper was further illustrated by slides giving views of St. Paul's, Westminster Abbey, Notre Dame and Cologne Cathedrals, and Rockliffe Church; also of lightning discharges showing, first, the popular representation of a flash of lightning, followed by others taken from photographs of actual discharges. These were lent by the Royal Meteorological Society. On the table were specimens of the fittings designed by the author for St. Paul's Cathedral, and exhibited by the manufacturers, the Carboid Company, of Westminster.

DISCUSSION OF THE FOREGOING PAPER.

The President, Mr. William Emerson, in the Chair.

Mr. WILLIAM MARRIOTT, Secretary of the Royal Meteorological Society, who rose at the invitation of the President, said that the Royal Meteorological Society was very much indebted to the Institute for having taken part in the Lightning-Rod Conference held in 1878 and

following two or three years. Professor Hayter Lewis and Mr. Whichcord represented the Institute at the Conference, and they with their colleagues devised and drew up the Report of the Lightning-Rod Conference. That Report was still, he believed, the standard work on the subject, and if the instructions given there were followed the best protection would be afforded to buildings. The manner in which the lightning rod should be placed outside the building, so as not to destroy the artistic effect, was, of course, a matter for the architect to determine. Lightning, to give a later definition than that quoted from the old Encyclopædia of 1820, was the visible discharge of electricity between one group of clouds and another, or between the clouds and the ground, during thunderstorms; and the object of lightning conductors was to carry off the electric discharge. He had been very interested in investigating thunderstorms. All must have been charmed and many fascinated by watching displays of lightning with the ordinary flashes; but some flashes were still more fascinating. The apparent flickering nature of lightning was often to be noticed; if photographs were taken of this lightning in two ways—first, when the camera was fixed, one flash only would be visible; but if the camera were not fixed but moved, then two or more precisely similar flashes would appear on the photograph. Dr. Hoffert, experimenting with a camera swinging backwards and forwards, got a number of flashes. They were a considerable distance apart, and precisely similar, with streaks going from one flash through the same prominent parts in the other flashes. The streaks indicated that these flashes were luminous for a longer time than lightning was usually supposed to be. A flash of lightning was supposed to last only an extremely small fraction of a second; but on these occasions the lightning was of sufficient duration to produce a streak along the plate, and these flashes all followed the same path. That would not have been apparent if the camera had been fixed. [The speaker went on to describe various curious effects observable in photographs of lightning displays taken by a camera held in the hand, and not kept rigidly fixed.] Speaking of thunderstorms, a subject which the Royal Meteorological Society had been investigating for some years, they were, Mr. Marriott said, simply miniature cyclonic disturbances. Cyclonic disturbances might perhaps reach a thousand miles or more in diameter; but these little thunderstorm disturbances might be only two or three or ten miles in diameter, yet the circulation round them was precisely the same as in a big cyclonic disturbance; the wind went round in the same way, the temperature observed the same law, *i.e.* rising in front and falling behind, and the barometer fell at first and afterwards rose, just as in a cyclone. [In illustration of an exceedingly interesting description which Mr. Marriott then gave of his investigations into the phenomena of thunderstorms, he showed a series of slides representing lightning displays, charts of various forms of cyclonic and anti-cyclonic systems, barometrical records of storms, and charts of their track, distribution, &c.]

MR. JOHN SLATER [*F.*], B.A. Lond., asked leave to propose a very hearty vote of thanks to Mr. Killingworth Hedges for his admirable Paper, and especially for the extremely interesting and beautiful views with which it had been illustrated. He should also like to include in the vote of thanks the gentleman who had just sat down; his remarks must have been of the most interesting character to all present. There were one or two practical points in Mr. Hedges's Paper which he should like to remark upon. As regards the best material for lightning conductors, as far as his observation went, the majority of electrical engineers concerned in the erection of tall chimney shafts preferred tapes to stranded wires, and he was rather surprised to hear from Mr. Hedges that in his opinion stranded wires were better. Perhaps Mr. Hedges would kindly favour them with the reason for this. He had always understood that the great advantage of tapes over wires was that all the connections to points, &c., could be made so much more easily. He quite understood that if they employed the elaborate system of connections exhibited they could get perfect connection; but connections of that sort were much more expensive than the perfect connections which could be made by flat tapes. Then, with regard to the safety of tall chimneys, was there any possible risk to the structure, to the stonework or brick-work of the chimney, in employing hoop-iron bond to go round the ring, not connected with the lightning conductor? Of course in the case of tall shafts the walls were built thick, and sometimes to get a better bond one felt inclined to put in hoop-iron; if, however, there was a possibility of the lightning current jumping across from the conductor to the metal, which might be within two or three feet of it, it seemed to him that such bond ought to be avoided altogether.

MR. EDWIN T. HALL [*F.*] said he had the very greatest pleasure in seconding the vote of thanks Mr. Slater had proposed. The subject was rather a novelty, and the evening had been exceedingly interesting. No doubt many remembered the Report to which reference had been made, and he was glad to hear from so great an authority as Mr. Marriott that the Report, though drawn up many years ago, was a text-book which they might follow at the present day. There were one or two questions of a practical kind he should like to ask Mr. Hedges. First, should a lightning

conductor be insulated from the building, or attached by metallic brackets? Take, for example, a very tall chimney shaft; was it better that the supports which are required by the conductor should be insulated from the shaft as it came down, or attached, as is the common practice in England, by a band nailed to the brickwork? Another point: it had become the practice lately, in order to get rid of large quantities of exhaust steam from big engine installations, to take the exhaust steam-pipe up the centre of a tall shaft, so as to carry the steam right up into the air. Was that a source of danger in connection with a lightning discharge? The practice was to secure the pipe to the shaft by cast-iron stays at intervals all the way up. There was, of course, outside the stack a lightning conductor, but from what Mr. Hedges had said, iron seemed to be as good a conductor as copper; should, therefore, the lightning strike the centre iron shaft, what would be the result? In the particular instance he was speaking of, the column was supported at the bottom by an iron stanchion; how could the whole be best protected?

Mr. H. HARDWICKE LANGSTON [*A.*] remarked that in the photographs of lightning which had been produced on the screen they had seen that all the streaks were crooked, none were straight. How was that associated with the theory that the means for conducting the electrical discharge should be absolutely straight? Again, was not the flash, of which they saw the result the electricity being liberated rather than the progress of the electricity itself?

Mr. C. H. BRODIE [*A.*] asked if it was not necessary for the base of the lightning conductor to be very carefully protected, so that people should not lean against it? Supposing, for instance, in a thunderstorm a man were leaning against the lightning conductor, would not the current be as likely to pass through the man as through the lightning conductor?

Mr. KILLINGWORTH HEDGES, replying to Mr. Hall's question about insulating the lightning conductor, said that there was very little good in ordinary insulation. The insulation must be perfect, as good as that used for high-tension currents; but the ordinary insulator was very little good, especially as storms occurred when there was rain and moisture on it, when it would become a conductor. It was better to keep the conductor away from the chimney shaft, and so to have a straight run descending it, clear of the projections of the building. That was best done by having metal supports built into the shaft, and letting them project, the supports being of such length that it was not necessary to bend the conductor in and out. There would then be no danger of the current running into the shaft. In Germany they had almost given up using tape; they used a round flexible cable of either iron or copper, of the same kind as that employed for the conductors at St. Paul's. As to whether iron or copper was used, that was simply a question of how much money they had to spend, and of durability. As regards lightning-struck buildings, there was great difficulty in getting accurate information. He hoped that, as one result of the discussion, architects who took sufficient interest in the subject would when a disaster occurred communicate the salient data to some central body, so that reports could be drawn up, based upon the results practically obtained. The Lightning Rod Conference, as Mr. Marriott had said, had done extremely good work, but nothing had been tabulated since 1882, and he had had the greatest difficulty in finding anything reliable since that date. He ventured respectfully to suggest that something in the nature of that Conference should be resuscitated; that gentlemen should be appointed by the Institute Council to associate with others to be appointed by the Royal Meteorological Society and perhaps the Royal Society. On the question of funds, he would suggest that the British Association should be asked to give a grant. A grant had, he thought, been suggested at the Bath meeting after Professor Lodge's Paper, but nothing had come of it, because there was no body equivalent to the Lightning Rod Conference to take the matter up. If the subject were brought forward by an authoritative body like the Institute, the matter might be revived, and they should get reliable data to act upon. He had had some photographs sent him of the damage caused to a church at Thirsk by one of the thunderstorms that took place last Monday—probably the same storm that travelled down and caused the fatality at St. Mary Cray. They had doubtless read of the case. An unfortunate man at a football match took shelter from the storm in a galvanised iron shed with a flagstaff on it. The current struck the flagstaff and glanced off and killed the man. That was a danger the Lightning Rod Conference had not put forward sufficiently for popular knowledge, viz., that if flagstaffs were put up in the neighbourhood of buildings they should be protected by a conductor; and if there was an iron building alongside, the iron roof as well as the rod forming the conductor of the flagstaff should be earthed. A matter of 30*s.* would pay for it. Had this been done at St. Mary Cray a fatal accident would have been avoided. With regard to the disaster at Thirsk last week, this was a case where the building deserved to be struck, for it had no lightning conductor at all. There was a large church at Thirsk, and within a hundred yards a small chapel: the church was not damaged at all, but the chapel and a neighbouring

building were very much knocked about. This was an instance of the side-flashing of the current referred to in his Paper. There was a sort of vane on the chapel that was struck first, the current then ran down the wet slates on to the gutter, and endeavoured to jump to earth. It traversed the gutter, and blew away the gutter supports. It then found a better outlet by the rain-water pipe after going round the whole building, but on its way a large amount of surging took place, and it did not go straight but gave a side flash and blew a lot of slates off, and then finally got to earth. He should like to ask Mr. Marriott, who he hoped would reply to some of the difficult questions that had been put, why in a case like this the windows were nearly always blown out. The windows were of thick cathedral glass, and every one of them disappeared except one in a glass door which was left open. With regard to Mr. Slater's question about tapes, he had not a very decided opinion upon the subject. Why he did not like tapes—ribbon conductors they were called—was because there was such a tendency to make "a nice job" and take them round corners and points. Professor Lodge showed by experiments—he himself had seen it done repeatedly—that if a wire was threaded in and out the current would not go that way—it would jump probably, if it could, to the continuation of the conductor; but if the conductor was not immediately underneath, or if there happened to be a convenient iron spout, with the perversity of high-tension currents it would just as soon jump sideways on to the iron spout and take another course. He did not quite agree with Mr. Slater that a better job could be made with joints using tape. He had specified "tape" in several cases, and he found that where the air terminal came on to the tape there was a kind of socket with a slit in it, through which the tape was put, fastened by a screw, and it was supposed to be soldered. On testing, sometimes, he found it was only resting quite loosely. He would not say that it could not have been made a good job, but it was a little difficult to do—more difficult than with a round thing, which can be fitted to the conductor and filled in with solder; because the vertical air terminal is of smaller diameter than the stranded conductor. If the copper conductor is unstranded, a little opening made, and the copper air terminal pushed into the middle of the conductor, and then filled up and soldered, and a socket placed outside, the joint cannot get out of order. At the same time tape was cheaper, a consideration during the high price of copper. With regard to a hoop-iron bound chimney, that opened up a fresh question. He did not know whether Mr. Slater had seen Professor Lodge's experiments, but there would be a great danger, in the event of the chimney being struck, of the current jumping to the hoop-iron; but as a matter of fact, chimneys were very seldom struck except when they were not being used. A chimney with a furnace underneath was a very good conductor in itself, and he did not think required any special lightning rod. But, of course, when the stack was cold, it required a conductor. With regard to Mr. Hall's question as to the exhaust steam pipe going up the middle of the chimney shaft, he thought it was absolutely necessary to earth that pipe; by that means they would make an excellent conductor of it, and then there was no danger of the electric current leaping from the proper path for it. The two should be earthed perfectly separately, not to depend one on the other. The conductor should be placed outside and earthed, and the exhaust pipe taken up the chimney and earthed at the bottom, which could be easily done. Generally a bend was made of a fairly large casting, and with a little scheming this could be attached to a suitable earth, so that it would not be destroyed by the heat of the furnace or the smoke passing up the chimney. With regard to Mr. Brodie's question about the lightning conductor, he certainly should not like to lean up against it; but an accident would be more likely to take place during a storm. On a fine day the current, very possibly, would pass down the conductor to earth, always providing the earth was suitable; but on a wet day there would be a good chance of the man, whose feet would be wet and who would be standing on wet ground, being a very good conductor himself. Mr. Langston's question he would ask Mr. Marriott to reply to. He understood Mr. Marriott to say that the lightning was seen curved round, but not that the conductor should be curved to receive it, because there was only one point of impact on to the conductor. It did not matter, for instance, how the spark from a Leyden jar came—it might come from a variety of directions—but it tended to strike the point of a conductor. A discharge from the clouds would probably act in a similar manner.

MR. MARRIOTT, replying to Mr. Langston, said that the lightning was not perhaps the electricity itself, but the visible discharge of electricity between one group of clouds and another. Of course, the electricity had collected, and the lightning flash showed the discharge of the electricity; but the lightning went in sinuous and various forms, and took the path of least resistance—and that was why it took that form—not a straight line as one would draw it with a ruler. It went in that direction, probably, because the air was of different temperatures, and it followed the path of least resistance until it came to the conductor or some object where it could get away. Hence the conductors should be of such efficiency as to carry off the discharge. If there were a

great many twists and turns the lightning might perhaps, if it was a strong flash, leap from one point to another and damage might be done; therefore it was very desirable to have a straight conductor of sufficient capacity to carry off the lightning.

THE PRESIDENT asked Mr. Marriott if he could explain why, when a church was struck by lightning, the windows should all be blown out?

MR. MARRIOTT said he should like to know a little more of the circumstances before he could answer the question fully; but he would give a little explanation with regard to tornadoes, with which thunderstorms were often associated. If a building was closed, and there was a tornado, or a depression, or a cyclonic system coming over, there was a great difference in the amount of atmospheric pressure in the centre to what there was outside—that is to say, the gradient was very steep, the barometer would be lowest at the centre. Then, supposing the centre passed over the building, the atmospheric pressure being less there than elsewhere, the air inside would consequently expand on account of the relief of pressure above, and, expanding, the windows would be forced outwards. Thus it was nearly always the case when tornadoes passed over buildings, that the windows were blown out, owing to expansion of the confined air inside the building.

THE PRESIDENT thought that there might also perhaps be another reason? Two of the illustrations were of buildings which had been struck, and the falling spires had crashed through the roof; would not the sudden inrush of wind through the opening thus made in the roof force the windows out? Given a church partially glazed, with only two or three windows unglazed, the wind in a violent storm would blow through the unglazed windows and force the windows out on the other side—he had known this happen in a church he was erecting. With regard to Mr. Hedges's suggestion that architects should communicate details of lightning disasters happening to buildings, it would be desirable that they should be supplied with some form or schedule of questions, so that they could fill in the details required; otherwise, probably, a mass of useless details would be given, and necessary information be omitted. With regard to any action by the Institute in conjunction with the British Association and others, if Mr. Hedges would formulate any scheme that would further this object, and put his proposals in writing, and send them to the Council, they would consider in what way they could co-operate with him.

9, CONDUIT STREET, LONDON, W., 28*th April* 1900.

CHRONICLE.

The Statutory Examination.

Pursuant to Section 140 of the London Building Act 1894, an Examination qualifying for Candidature as District Surveyor in London was held by the Institute on Thursday and Friday, the 19th and 20th inst. Three candidates were examined and passed, viz.:—

HENRY NATHANIEL KERR, of Berwick House, 139, Oxford Street, W.

WALTER HENRY WOODWARD, of 69, Kennington Oval, S.E.

ERNEST ALEXANDER YOUNG [*A.*], of 12, Donaldson Road, N.W.

These gentlemen have been granted by the Council Certificates of Competency to act as District Surveyors in London.

THE LAW OF ANCIENT LIGHTS.

Suggestions for its Reform.

The discussion of the question of Reform in the Law of Ancient Lights, adjourned from the Meeting of the 19th March, when Papers on the subject were read by Messrs. J. Fletcher Moulton, Q.C., M.P., J. Douglass Mathews, and Beresford Pite [pp. 209 *sqq.*], was resumed on the 9th inst.

THE PRESIDENT, in opening the proceedings, observed that the question before them was one of great importance. The law relating to ancient lights had been the means of much unscrupulous conduct, and the cause of blackmailing and other injustice. The time had arrived when strenuous exertions should be made to discover a remedy for the evil, or to obtain some alteration in the law. He hoped that during the discussion some practical points would be suggested that might be of use in the event of action being taken. As a sequel to the discussion, he thought it would be a good plan to form a committee, consisting of two or three members of the Institute, two or three members of the Surveyors' Institution, and two or three lawyers, with a view to approaching Parliament on the matter, if thought desirable.

The President then read the following letter

from Mr. Thomas M. Rickman, President of the Surveyors' Institution :—

8, Montague Street, Russell Square, W.C.: 9th April 1900.

DEAR MR. PRESIDENT,—I am very sorry that my doctor refuses me permission to come this evening, as I had intended, to the renewed discussion of the question of Ancient Lights. I feel very strongly, in the words of Mr. Fletcher Moulton, that "the rule that existing rights shall not be interfered with is too drastic to be adhered to." Also that the presumption of law in favour of existing dominant lights is contrary to common sense. But these are only my private opinions. Should Mr. Brodie's resolution be carried this evening, I shall be most happy to do all in my power to bring the Council of the Surveyors' Institution into touch with your Council or Standing Committee, so as to obtain a combined discussion of the whole subject.—Yours faithfully,

THOS. M. RICKMAN.

William Emerson, Esq., President R.I.B.A.

At the request of the President, the Secretary then read the following communication from Mr. Arthur Cates :—

Everyone interested in the establishment of right and justice, and in the abolition of the tyranny and blackmailing perpetrated under the sanction of the present law of light as administered in the Courts, must be grateful to the Practice Standing Committee for having brought the subject again before the Institute, and for having introduced its discussion by the three able Papers read on the 19th ult.

For many years at intermittent intervals the subject has been considered and discussed here, resulting in the publication in the PROCEEDINGS and TRANSACTIONS of a large amount of valuable matter, which might now be collected and, so far as it may bear on the reform of the existing law, be republished as a convenient handbook for the information and assistance of those who may desire to follow up this discussion to some practical conclusion.

The discussion on the Paper on "The Law of Easements," read by Mr. Locock Webb, Q.C., on December 17, 1877—TRANSACTIONS, 1877-78, pp. 88-112—elicited an article entitled "The So-called Law of Ancient Window Lights," which appeared in *The Builder* of January 26, 1878. This article, which was quoted at some length by Mr. John Whichcord in his preliminary statement —Special Committee on Light and Air—(PROCEEDINGS, Session 1881-82, No. 18, 27th July 1882, p. 236) was written with great care, and, combining the results of a special study of the subject and of a somewhat extensive professional experience, strongly advocated a complete reform of the existing law.

Another article, "Reversioners and the Acquisition of Rights of Light," which appeared in *The Builder* of 12th January 1884, dealt with a position of great difficulty, under which the most onerous dominant rights frequently grow up.

Both these articles it would be most valuable to include with the suggested reprint of excerpts from our PROCEEDINGS, &c.

Assuming that the resolution which Mr. C. H. Brodie proposes to submit to the Meeting will be adopted, it would appear to be desirable that no attempt should be made to devise some scheme for merely diminishing the evils which, it is admitted, the existing law as now administered permits and encourages, thus to a great extent accepting the present state of the law as equitable and correct—but rather, the endeavour should be made, *inter alia* :—

To investigate the principles on which it is alleged that such law is based.

To ascertain the reasons which influenced the Legislature in enacting the particular clause under the alleged authority of which so much extortion is practised and hardship inflicted.

To illustrate the mischievous and unjust action of the law, and the opportunities it affords for oppression and extortion, and thus give good reason for the pressing necessity for a radical change.

To inquire into the law of other countries on the subject.

As regards rights of light which are manifestly encroachments on the servient tenement, to consider how such servient owner could be protected, by the really equitable and just system in force in Scotland, or otherwise, from the aggression of his neighbour—the real evildoer and first aggressor, the dominant owner.

In addition to the references given by Mr. Brodie in his memorandum on pp. 234-235 *ante*, much useful information in the direction above indicated will be found in my remarks in the discussion on the law of light and air—PROCEEDINGS, Session 1880-81, No. 13, 17th March 1881, pp. 188-191. The information given is based upon actual experience—regulations controlling the height of buildings in relation to the width of streets, the French law, the Scotch law, &c., generally pointing to the necessity for a reform of the law—and will be found of service in the consideration of the matter, but would occupy too much time to recapitulate here.

The Special Committee appointed after the above-mentioned discussion requested Mr. J. Leybourn Goddard (author of *The Law of Easements*) to report on the law respecting light and air as it existed previously to the passing of the Prescription Act, and to show how the law of prescription grew up before that Act was passed, what were the reasons for the passing of the Act, how the Act

was brought in and passed through Parliament, and how the law regarding light and air was affected thereby. Mr. Goddard's Report was printed in the PROCEEDINGS 1881–82, 11th May 1882, pp. 254–267, and clearly shows how little consideration was given to the question of light. The Prescription Act was the first result of the labours of the Royal Commission on the Law of Real Property, and on p. 263 Mr. Goddard sets out the few words in which this most important subject was summarily dealt with by Lord Tenterden—without explanation or qualification—and thus became law without apparently any discussion or amendment in either House.

Mr. Edward Stanley Roscoe, who was associated with me on that Committee, also carefully examined the Report of the Royal Commission and the evidence on which it was based, but did not find that the question of the right to light was specially discussed either by the Commissioners or the witnesses; and it seemed to him to follow that, as the question was not discussed in Parliament, the Act was passed, so far as regards the right to light, without there being any reason for it, and without any consideration of its probable consequences; and there appeared to him no reason why the mere fact of such a measure being in the Statute Book should be any argument against its repeal, having regard to the circumstances under which it became law. Mr. Roscoe's observations will be found in PROCEEDINGS, Session 1882–83, No. 15, 31st May 1883, p. 143 and No. 16, 14th June 1883, p. 154.

In the PROCEEDINGS, Session 1882–83, No. 10, 8th March 1883, p. 96, there is a communication on the subject from the Manchester Society of Architects in which they say: "The simple gaining of an easement of light over an adjoining property, by lapse of time only, this Council does not consider justifiable, and it would be glad to see the law altered. The system of gaining an advantage surreptitiously is not in accordance with the views of morality held by the Council of this Society."

In the JOURNAL OF PROCEEDINGS, Vol. II. N.S., No. 19, 12th August 1886, pp. 281–285 are "Reports on the Law of Light and Air in Scotland," contributed by William and C. J. MacLean for the Glasgow Institute of Architects—and by the Edinburgh Architectural Association.

The latter report thus summarises the law: "In Scotland such servitude is regulated by express grant or contract, and cannot be constituted by prescription. In the law of Scotland, light and prospect is a negative servitude, *i.e.* a servitude in virtue of which a servient proprietor is prohibited from performing some act which, but for the servitude, he would be entitled to perform. A negative servitude can only be constituted by a grant. It does not admit of possession, and therefore cannot be acquired by prescription."

Personally I am very pleased to have been able to bring this just and equitable view of the law to operate to a limited extent in London. Some thirty years ago, when consulted by the Commissioners of H.M. Woods in charge of the estates of the Land Revenues of the Crown in London, with reference to the management of those estates, I advised that, in order to put a stop to scandalous litigation between the Crown tenants, resulting in blackmail or the crippling and cutting down of buildings and hampering the development of the estate, all future leases should contain a proviso taking away from the lessee all right of light over adjacent Crown lands. This recommendation was adopted, and such proviso has since been invariably inserted in every new lease. Shortly afterwards, this came incidentally under the notice of the Master of the Rolls (Sir George Jessel), and was warmly approved by him. The proviso is as follows:

"Provided lastly: and it is hereby further agreed and declared and this demise is made upon the express condition that the said lessee his executors administrators and assigns shall not by virtue or in respect of this present demise be deemed to have acquired or to be entitled to neither shall he or they during the existence of the term hereby granted acquire or become entitled to by length of enjoyment prescription or by any other means whatsoever in respect of the premises hereby demised any right of air or light or other easement from or over or affecting any land or hereditaments belonging to Her Majesty not comprised in this demise but on the contrary it is agreed and declared and the said lessee doth hereby covenant and grant with and to Her Majesty her heirs and successors that it shall be lawful for Her Majesty her heirs and successors and for the said Commissioner or Commissioners and her his and their grantees lessees or tenants at all times hereafter to erect any new buildings of any height on any land belonging to Her Majesty not included in this demise and to raise to any height or alter any buildings now existing or to be hereafter erected on any such land as last aforesaid whether any such buildings or alterations as aforesaid may or may not prevent obstruct or affect the passage of air or light to the premises hereby demised or any part thereof or to any new building which may hereafter be erected on the land hereby demised."

This proviso has worked admirably: litigation has been prevented, the development of the estate has not been impeded by rapacious or cantankerous owners of dominant rights, the rents obtained have not been affected, and no one has been injured by its operation.

Thus in course of time, when existing terms have run out, and the proviso will under the new leases have become applicable to the whole estate—the Crown estates in London will by the opera-

tion of that proviso, and the effect of the decisions of the High Court in Perry *v.* Eames,* and in Wheaton *v.* Maple,† be placed much in the same position as if under the law in force in Scotland—and be entirely outside the operation of section 3 of the Prescription Act.

The efficient municipal control of buildings generally—of the width of streets, of the height of buildings, of the open spaces in the rear of buildings, and the sanitary enactments as to provision of due access of light and air—should amply suffice to meet the requirements of the Roman law under the servitude of "*Altius non tollendi*"; and to protect all alike, in the interests of public health, from those encroachments by bold and unscrupulous speculators, who are now to some degree held in check by the operation of the existing law, and who certainly require to be more rigidly controlled than seems possible under the building laws at present in force.

Every endeavour must be made to dispel the prevailing idea that the wrongdoer and offender is the owner of the servient tenement, who, by building on his own land, takes away from the dominant tenement something for which the owner thereof has given no consideration, and has acquired in such a manner that the unhappy owner of the servient tenement has had no power of protecting himself from the acquisition of a right over his land, seriously affecting its value and controlling its user by him, to the advantage of a stranger who benefits without payment by the increased value of his land derived from the rights he has so acquired over his neighbour.

No mere palliation of the wrongs now inflicted on the servient owner for the advantage and benefit of the real evildoer and first aggressor, the dominant owner, should be attempted, but the aim should be to establish as a principle that no indefeasible right to light should be allowed to be gained by mere effluxion of time, or otherwise than by an express contract between the owners of the dominant and servient tenements.

5th April 1900. ARTHUR CATES.

The President then called upon Mr. Brodie, one of the Honorary Secretaries of the Practice Standing Committee, to move the Resolution of which notice had been given.

MR. C. H. BRODIE [*A.*] explained that his position on that occasion was purely an official one. The meetings for the discussion of the subject before them had been arranged by the Practice Standing Committee, who had been fortunate in securing the excellent Papers read at the previous meeting by Mr. Fletcher Moulton, Mr. Douglass Mathews, Chairman of the Committee, and Mr. Beresford Pite. The Committee had come to the conclusion that the law stood in pressing need of alteration, and had drawn up the resolution of which notice had been given, and which he, as the mouthpiece of the Committee, would forthwith move—viz.

> "That this Meeting considers an alteration in the law of Ancient Lights to be urgently needed, and requests the Council to put itself into communication with the Council of the Surveyors' Institution without delay, with a view to the co-operation of that body in taking such steps as may be necessary to secure an amendment."

The subject was admittedly one of pressing importance. It had been shown in various Papers that such prescriptive rights of light as could be acquired in England were not capable of acquisition in Scotland, Sweden, France, or the United States. Why should such rights be allowed to accrue in England when they were capable of being so mischievously exercised? That he might not be accused of overstating the position, he would quote some of the remarks made on the subject which bore out the view of his Committee. Mr. Moulton in the early part of his Paper said: "The question of law reform in this respect is one of immediate and pressing importance." Later on he said: "Our Courts are often practical at the cost of logical consistency, and their behaviour in this respect shows that they have realised the fact that the absolute rule that existing rights shall not be interfered with is too drastic to be adhered to under the needs of a rapidly increasing town population." Further on Mr. Moulton said—and doubtless his practice in the Courts had led him to the conclusion—"that the strict rights of light given by the Prescription Act are very onerous and often very injurious to the proper development of our towns." All who had followed the subject must be absolutely convinced of that. Speaking of a neighbouring owner's light, Mr. Moulton observed: "His light must not be interfered with, however great the inconvenience to his neighbour"—that is to say, his building neighbour—"and however little the injury to him if it be more than infinitesimal. Too often such a state of things leads to what is nothing less than levying blackmail on the building owner. He must pay what is demanded or abandon his scheme." Was that a position in which they should be content to rest? Of course, as Mr. Moulton said, it was those cases in which the owner of the dominant tenement insisted upon his strict rights at the cost of inflicting on his neighbour inconvenience, without any corresponding advantage to himself, which rendered a change in the law so necessary. Such a change they hoped shortly to succeed in effecting. Mr. Mathews pointed out that, as matters now stood, an unscrupulous person could prevent his neigh-

* *Journal of Proceedings*, Vol. VII. N.S., No. 12, 9th April 1891, pp. 257-60.

† *Ibid.* Vol. IX. N.S., No. 19, 24th August 1893, pp. 487-8.

bour using his property to the best advantage except by payment of compensation, often amounting to "blackmail." That was a very unpleasant term to use, but it was often employed to describe the transaction. He (Mr. Brodie) did not think that a law which permitted it should be allowed to remain on the Statute Book. Mr. Mathews went on: "And the law affords us no means otherwise than by mutual agreement to alter old lights in a way that may be beneficial alike to the owner of the dominant light and to the person erecting his new building." Mr. Mathews had also pointed out that this particular Act was passed nearly seventy years ago, and that what was perfectly reasonable then had become very unreasonable now. No one would dispute that statement. Mr. Pite's Paper simply scintillated with brilliant points against the Act, and the way it was administered and affected so injuriously owners of property. He (the speaker) had put together for the JOURNAL [pp. 234-37] various passages on the subject from the JOURNALS and TRANSACTIONS of the Institute, and Mr. Cates had amplified them very considerably in the communication with which they had been favoured that evening. In 1890, Mr. John Holden remarked, when discussing Mr. Slater's Paper on "Building Legislation," "The obtaining of an easement by prescription is, in my opinion, a simple piece of dishonesty." In 1889 Professor Kerr said: "The inconvenience that arises in London from the practical application of the law of ancient lights is indescribable. . . . The trouble into which neighbours get, and the hallucinations under which they labour as regards their rights to blackmail each other, are remarkable." In 1889 Mr. J. J. Stevenson, in a Paper on "Laying-out Streets," stated that the law acted "in a perfectly haphazard and irregular manner, depending on mere accident, and consisting in stealing a neighbour's property if he does not look out, at cost and trouble to himself, to prevent it." In 1877 Mr. T. Chatfeild Clarke said: "So many opportunities are now afforded for litigation, when the effort is often one merely to extort money, that a remedy is urgently demanded." As long ago as 1866 Professor Kerr quoted the opinion of two Lord Chancellors—Lord Westbury and Lord Cranworth—who said that they did not hesitate to deplore the effect of the decisions they were pronouncing, and to suggest that the time had possibly come for the Legislature to interfere. If that time had come in 1866, how much more necessary was legislative interference now! Suggesting means of bringing about a change, Mr. Brodie was of opinion that the Act they should strive to obtain should consist of two clauses. The first should enact that on and after a certain date the Prescription Act should cease to have any operation at all. Existing ancient lights must, of course, be respected, but the Act otherwise should be allowed to lapse. Clause No. 2 should apply to actions for light exactly the same procedure as that relating to party-walls in the London Building Act. Parliament having given that procedure, and it having been found to act perfectly well, were strong grounds for applying similar procedure to questions of rights of light. In support of his contention Mr. Brodie quoted from the JOURNAL of the 16th March 1893, where, in discussing the Science Committee's Report, Professor Kerr stated his opinion that the principle of the Building Act with regard to party-walls provided a very excellent rule for dealing with questions of ancient lights. At the same Meeting another eminent surveyor, Mr. Charles Fowler, expressed his entire agreement with the proposal that this principle should be applied to ancient lights. With those statements he (Mr. Brodie) hoped the Meeting would agree, and pass his Resolution. The necessity for an immediate alteration in the law had been driven home very strongly to him by the very last case he had had occasion to sit out in the Law Courts. It was an action to restrain the defendants, a Turkish Bath Company in the West of England, from erecting baths facing a chapel so as to obstruct light coming to class-rooms beneath the chapel. Part of the site had a few years before been occupied by a high prison wall which partly shut out light from the class-rooms. Since the removal of the wall the class-rooms had enjoyed a good light. The city surveyor stated in evidence that the class-rooms were not fit to be used as such, and he had endeavoured to get them closed. [By a rough plan chalked on the blackboard Mr. Brodie showed how trivial was the grievance suffered by the plaintiffs.] The case was brought to London and heard in the Chancery Division, lasting several days. Numerous witnesses were called on either side, and costs mounted up to an enormous sum. The defendants lost; they were ordered to pull down part of their building and to pay the costs. The result was that they went into liquidation and the baths were closed. As far as his observation went, it was never so much the question of light which the parties fought about; there was always some question of spite or greed involved. With regard to the case he had alluded to, if the architect of the baths and the architect of the owners of the chapel had been allowed to discuss the points in dispute with, say, their friend Professor Kerr as the third surveyor, the matter would probably have been settled in an hour on the spot, and ample justice done to both sides.

PROFESSOR T. ROGER SMITH [*F.*] seconded the Resolution. It would be easy, he said, to illustrate to any extent the hardship and injustice that occurred from time to time, but that need not be dwelt upon. The question for them to consider was the remedy, and the only feasible

remedy was legislation. It was no doubt true that a certain portion of the procedure was within the discretion of the Judge. But they must recollect that the Judges were bound hand and foot by precedent, and under ordinary circumstances they dared do nothing contrary to it. Consequently it could not be expected that the Judges would alter the procedure or make it less irksome than it was. If the Institute decided to promote an Act it would receive, he thought, the cordial assistance not only of the Surveyors' Institution, but of the Institute of Builders, and probably the great landowners in London and other large owners of property. To a certain extent also he thought they might rely on the assistance of the lawyers in Parliament, but only to a certain extent. Mr. Fletcher Moulton and Mr. Strahan both suggested modifications in the operation of the law irrespective of any question of repeal of the Act, and there was no doubt the feeling of the other members of the Bar who sat in the House of Commons would go with them. The remedies or improvements they suggested were first of all the awarding of damages instead of granting an injunction where disturbance of light was threatened but had not actually taken place. Under existing rules that could not be done. Where an action had begun early enough, the only remedy the Judge could give was by injunction, and half the harshness of the procedure resulted from the fact that the remedy was much more formidable than the case required. The result was that persons were willing to pay sums of money in order to escape it, and as a rule where the injunction was enforced it was unsatisfactory to both parties. That was one of the matters which must be included in the Committee's Report. The next, and a very desirable, remedy would be the allowance of compensating advantages as a partial compensation. Those were ordinarily entirely shut out from the courts of law. Arbitrators from a sense of justice took them into consideration, but they had no right to do so, and the compensating advantages only indirectly influenced their awards. A compensating advantage was the use of white tiles—the use of reflecting surfaces—in fact, the admission of reflected light. He should like to mention one or two other compensating considerations which ought always to be considered. The first was the removal of some existing obstacle. It often happened in a building scheme that something was going to be taken down as well as something put up, and the admission of light at one point might often compensate for its obstruction at another. Under the existing law and its administration that could not be taken into account. Mr. Douglass Mathews had referred to another method of compensation—viz. meeting the expense of altering the dominant building so as to enlarge its lights. An expenditure of perhaps £10 would often remedy any damage that threatened a building, and this was a matter that ought to be compulsorily taken into consideration. Another thing he would draw attention to was the compensation many a building owner took care to secure for himself beforehand. Cases were numerous where a man enlarged considerably his own lights and increased the burden on the servient tenement, and then he came down on the servient tenement not with complete windows but with little fragments of windows, and claimed protection against each trifling obstruction. The fact that he had already lit his building by newer portions of windows ought to be a complete answer to such a claim. But as a matter of practice it was not. The suggestion that there should be a notice formally registered, instead of the present clumsy method of putting up a screen, commended itself at once, and more than ever now that the London County Council were making difficulties about the erection of screens of this kind. As far as these modes of reducing the harshness of procedure went, they might carry the lawyers with them, but it was doubtful whether they would go farther. The best substitute for the present practice, and a measure included in the report of their Committee, would be a system similar to that known as the party-wall procedure, which might practically put a stop to litigation. If any one would consider how many houses were taken down and rebuilt in London in a year, that each of those houses had two party-walls, and that probably in each case there were not less than half a dozen owners with conflicting interests, and then would find out how many party-wall cases went to the superior courts in the course of a year, it would be seen that to a very large extent that excellent mode of procedure was most effective in disposing of difficulties. It settled the case of the party-wall justly and equitably and promptly. An objection had been made that the nature of an ancient light was so different from that of a party-wall that it could not be adjudicated upon in the same way. He doubted that very much. He had acted as the third surveyor in party-wall cases, and he had had some experience in ancient lights disputes, and his opinion was that the care and intelligence exercised with such success in the settlement of party-wall cases would be equally efficacious in disputes about ancient lights. Among the recommendations of the Committee was the proposal for an expert tribunal. Such a tribunal had been created by the Building Act for other purposes, and he could not help thinking that it would be quite feasible to refer ancient light disputes to that tribunal, and that it would be found well qualified to deal with them. At the present moment the tribunal was composed of the author of the latest book on Ancient Lights, and two men with very eminent qualifications, and if they could not dis-

pose of any difficult case he did not know who could. The last and most important point to strive for was the entire abolition of the acquisition of lights for the future. As a matter of practice it might be more convenient to enact that no windows should acquire rights of light by prescription which were not in existence when the Act came into operation. He hoped that that would be kept in view as the ultimate object, as well as mitigating the mode of dealing with existing rights. Such rights could not be swept away. They were properties attached to the building; considerable sums had in many cases been paid in consequence of their existence, and they could not justly disfranchise the owners of those rights. It should, however, be rendered exceedingly difficult, or impossible, to deal with them by way of injunction, but every facility should be afforded for settlement by money compensation, which should be virtually the only remedy, and should be equitably and cheaply applied.

Mr. EDWIN T. HALL [*F.*] said they must all be deeply obliged to the Practice Committee for bringing this important subject before the Institute at that stage. They had more leisure now to deal with it than they had a few years ago. The President had asked them to discuss the matter from a practical point of view, and he should endeavour to offer some suggestions dictated by his own experience and from a consideration of the subject. He should like to clear the ground a little by referring to one or two observations of a previous speaker. Mr. Brodie remarked that every man should light his own building within the curtilage of his property. That, however, was hardly possible in crowded places like London. In dealing with a subject of this sort it must not be forgotten that the law of prescription was held by lawyers to be essential in order to prevent friction and litigation. The law of prescription recognised the rights of an individual owner, but they must not be exercised so as to obstruct public convenience. They owed to the Prescription Act rights of way, footpaths over vast estates in the country, without which they would have to go miles round to reach a place only a short distance off. Bearing this in mind no one could wish that the law of prescription should be abolished. In like manner water rights were most important, and no doubt it was the consideration of these things which induced the Legislature to recognise prescriptive rights in regard to light. The same principle applied in respect of railways. No private person, because he was the owner of a large property, could prevent a railway being carried through it when it was for the public convenience. It was equally in the public interest that buildings should be allowed to be increased in height, and therefore the Legislature which had granted the public a right of passage through private property should also refuse to recognise the right of an owner to prevent the height of a building being raised where the public convenience rendered it necessary. London buildings originally were probably only one story high, but as the population increased and land went up in value it became necessary to increase the number of stories. From a public and sanitary point of view the power to prevent the overcrowding of buildings was a salutary one; if there were not some restriction all sanitary considerations in regard to light and air permeating through and around buildings would be neglected. He also thought that if a man in developing a building estate that had formerly been agricultural land approved a plan of a building showing windows overlooking his own adjacent land, he ought not to be allowed to let the adjacent land to some one who could build right up to the edge and obstruct the light coming to the windows he had already sanctioned in the other house. If that principle were sound it ought to apply in all cases of adjacent buildings, and there should be a certain space reserved. Mr. Cates had drawn attention to the fact that the Woods and Forests Commissioners did the same. The Ecclesiastical Commissioners carried out such a practice on their estates. Those bodies would not allow a man to erect his building so that it should ruin his neighbour's, and the practice was found to answer admirably. He would submit, as a practical suggestion, that when a new light had been acquired by mere lapse of time, say, at a distance exceeding 10 feet from a neighbour's fence, the adjacent owner should have a right to build to the same height at the same distance from the fence. That would get rid of the question of a dominant right accruing by effluxion of time over the adjacent land. No injustice would be done to the first man, and sufficient light and air would be secured between the buildings. If the new light were nearer than 10 feet to the adjoining owner's fence, the dominant owner should pay during twenty years—the time, that is, during which he would otherwise acquire the right—to the servient owner a rent to protect the dominant owner's light rights, which rent should be equivalent in value to what he might reasonably expect to get by way of compensation for any injury to that light if he acquired it by mere lapse of time. If he did not pay this rent, he should not be allowed to acquire a right. Another suggestion he would make was that where a high building and a low one faced each other on opposite sides of a road the owner of the low building should be entitled to carry his building to the same height as the opposite building without paying any compensation at all. That is to say, the man who had built the tall building should not acquire rights over his opposite neighbour simply because that opposite neighbour had chosen to erect or retain a

low building. In other cases he would suggest that the fact of there being a public way between any two properties should *ipso facto* give a man a right to build within an angle of 45 degrees from the level of the pavement on the opposite side of the way. They constantly heard of miserable cases which simply amounted to blackmail, and on the blackmailing side evidence was often given by people in the profession or connected with the profession which shocked every right-minded man. If some such rule as he suggested were enforced a great many of the difficulties would be overcome. Then if any building was carried to a greater height than formerly without compensation to the owner on the opposite side of the street, that owner should have a right to build to the same height. Such a practice was constantly followed. He had made dozens of agreements of the kind in his own practice, and he thought them an eminently equitable way of dealing with these cases. If right-minded owners so agreed between themselves the Legislature should sanction some similar procedure, and so get rid of many of the difficulties which at present hamper them. Where such remedies as he had suggested would not apply he quite agreed that it would be a perfectly reasonable course to appoint three surveyors, as in the case of a party-wall, and in the event of their disagreeing, or either side challenging their decision, the case should be taken to the Tribunal of Appeal as constituted under the London Building Act, and that court should be the final court of appeal. With regard to cases where money compensation was rightly due, the Tribunal would, he was sure, do perfect justice. They must remember that the Legislature would never be brought to pass an Act to rob a man of property. They must try to be practical, and talk not of what they would like, but of what they were likely to get.

Mr. THOMAS BLASHILL [*F.*], referring to Professor Roger Smith's remark that the London County Council were taking steps which would practically render the raising of screens impossible, said that that was hardly the case. The point of view the Council took was that these great screens, sometimes 40 or 50 feet high and amounting to something like a timber stage, were dangerous as regards fire. The effect of their action had been to get people to put up iron or incombustible screens instead of wooden ones. It was a more difficult and more expensive operation, but screens could be put up just the same. There was one point in Mr. Fletcher Moulton's paper which recalled to his mind a case of light and air he (Mr. Blashill) had been concerned in. Mr. Moulton said that a man had a right under the present law to the use of the light which he had before, whether he wanted that light or not —or words to that effect. The case recalled to him occurred in the City. He was reconstructing a building which had had the ordinary windows of a house in its front. Being for a public purpose the new building had a very different kind of light from the original building, both as regards the height of the stories and the amount of the window space. Some three or four years after, the owner of property on the opposite side of the street, which was very narrow, began raising his building two or three stories. A dispute arose, and they went before the then Master of the Rolls, Sir George Jessel, who had a great reputation for bringing a highly original mind to bear upon every subject which came before him. He said in this case that the owners had preserved, no doubt, in the larger and differently spaced windows of the new building some portions of the original windows of the house, and in those portions only were they entitled to unobstructed access of light. From the fact that they had preserved certain portions of those windows the owners must not be allowed to acquire in time a right over the whole of the new windows. The question was, had they preserved so much of the old lights as would be sufficient for the purpose of the new building? because, if they had not, the building opposite had done them no harm. His lordship directed them to put up a screen in front of the building, so as to reproduce the windows that existed in the old building; they would then find out whether enough light was admitted through the screen and through the new windows for the purpose of the building. This they set about doing, but as the work proceeded they became rather doubtful about their case. It appeared, too, that their opponents opposite were not very sure of theirs. The result was that the parties agreed to drop the case, each paying their own costs. He was sorry the case so ended, for the test proposed by Sir George Jessel was eminently sensible and just, and he should have liked to have seen how it turned out. It seemed to him that the principle laid down by Sir George Jessel in this case modified the view presented by Mr. Fletcher Moulton, for the light would not be protected unless it was a useful light sufficient for its purpose. He was quite in agreement with what had been said as to the desirability of treating ancient lights questions on something of the same basis as party-wall questions. If that did not settle a dispute then let them go to the Tribunal of Appeal. These constituted two methods of settlement either of which would be found immeasurably superior to the present procedure.

Mr. DELISSA JOSEPH [*F.*] said he had carefully read the Papers on the subject in the Journal. They were full of interest and gave one much food for thought. It seemed to him that in any proceedings they undertook, they must

accept the fact that the law had given certain rights. The owner of a window had as much right to protect his easement as the owner of a right of way. They must not, therefore, ask the Legislature to interfere with existing easements, but merely to simplify the law and the procedure in connection with it. They might ask Parliament to make the acquisition of new rights more difficult by one or other of the methods suggested in the Papers. The Swedish method of registered agreement seemed simplicity itself, and might well be considered by the Committee to whom this question was to be referred. Parliament should also be asked to define the principles which should guide them in ascertaining and allowing for the rights of these neighbours. It would be extremely useful to have defined not only the horizontal angles of light but the much more troublesome lateral angles of light. Appeal to the Law Courts should be permitted only in the last resort, and after reference to an umpire or a technical tribunal. There would be no greater hardship in referring ancient lights disputes to an umpire or to a technical tribunal than there was in the case of party-walls. In party-wall cases, which were almost as complex and varied and difficult as those of ancient lights, the appointment of adjoining surveyors and of a third surveyor to adjudicate upon the question had answered most satisfactorily, and party-wall cases rarely drifted into the Law Courts. Equally beneficial results might be obtained in the same way for ancient lights cases. The suggestion as to notice to surrounding owners necessarily followed that with regard to adopting party-wall procedure in general. The difficulties perhaps might be greater in ascertaining the surrounding owners who were entitled to notice, but it would have the advantage of checking unexpected claims at the eleventh hour, as they would know at once what objections they would probably have to meet. Something had been said about a natural hesitation to refer matters of this kind to arbitration, because there might be a question of ownership concerned. In nine cases out of ten, however, no legal question of an abstruse character arose as to the existence or non-existence of ancient lights. Most men usually carefully measured their buildings before pulling them down, or kept some record of them, and the Building Act gave facilities for getting these records certified. In most cases in the City of London they had a record of the existence of ancient lights, so that purely legal questions need scarcely ever be brought before the arbitrator. Questions of the effect on old buildings of the encroachments on admitted lights should, he considered, always be taken to arbitrators. One or two speakers had referred to the hardship of rapacious adjoining owners claiming compensation for encroachments. One ought, however, to study the surrounding property very closely before pledging oneself to a building. It was not easy to take into account the numerous difficulties which present themselves in town buildings; it was indeed an art in itself to design a building which would not encroach on the surrounding rights of light; but if reasonable regard be had to the possible claims of surrounding owners, mutilation of the building was rarely necessary. His own experience was that in nine cases out of ten differences could be adjusted by negotiation. Where that failed arbitration could be tried. The Law Courts was the last resort. He did not agree that the raising of a claim for compensation must necessarily be regarded as a grievance. The law gave a man a certain right, which he was entitled to have respected, and if it was taken away he ought to have its market value. To arrive at the market value of a light he had adopted the following method with success. He estimated the rental value of the floor space gained from the increased height obtained by the encroachment. That sum capitalised represented the capital value of the increased rental, and upon that the compensation was based. As a rule where that was adopted the compensation paid recouped itself in a year or two. Models, which some one had said were of little service, he himself had found of the greatest possible value. They brought to the minds of both lawyer and layman a conception of the circumstances which no diagram could do. Quite recently he had prepared a model in a case which his client wished to take into Court. He advised him, however, to lay the matter before Mr. Fletcher Moulton. The model was taken to the House of Commons and submitted to the eminent counsel, and within half an hour he came to the conclusion that they had no case to take into Court. His client was thus saved the anxiety and expense of litigation by the advice of an experienced man, who in forming his opinion was materially helped by the model. He always advocated a model even if the case did not go into Court, because it often showed one's client the futility of his case, or his neighbour the unreasonableness of his claim. No one, he believed, had referred to the method of dealing with these difficulties in Scotland. The Guild Court had complete control of all building questions in Edinburgh. Before buildings were commenced, plans were laid before this Guild Court, which decided questions of construction, foundation, ventilation, mutual support, party-walls, drainage, the application of local by-laws, and also what was technically termed the "neighbourhood" of buildings. All questions affecting the relation of one building to another were equitably adjusted by the Court, very much after the manner in which the Ecclesiastical Commissioners and the Commissioners of Woods and Forests dealt with their estates. The consequence was that by the time the Court had passed the plans it had settled

most of the burning questions which in England usually arose in the course of erection. It settled, too, the question of light, reserving to each party ample space for light and preventing either party prejudicing the other. He thought that not quite enough stress had been laid on the fact that the Building Act of 1894 tended towards checking the upgrowth of new easements of the troublesome character of those under discussion. The broad principle of limiting the height of buildings, and the broader principle of defining the rear angles, practically had the effect of forcing a man to light his property within his own area. As regards the general question, what was the real solution of the difficulty? In the first place it must be accepted that vested interests cannot be interfered with. They could only ask the Legislature to make things easier for an equitable adjustment of these matters, and, if possible, without resort to law. His own experience led him to speak strongly in favour of reasonable negotiation between parties; and if that failed, arbitration was an invaluable resort. With sixteen or seventeen years' extensive practice in ancient lights cases, only once had he gone into Court, and this, he submitted, was good evidence of the value of reasonable negotiation. So long, perhaps, as the law was made by lawyers, as it had been for centuries in the House of Commons, new legislation would hardly tend in the direction of the settlement of disputes without appeal to the Courts. But supposing Parliament declined to give such facilities as voluntary or compulsory arbitration, then they must fall back on the suggestions made by Mr. Fletcher Moulton. They were in themselves extremely valuable, because they were based on precedent. Mr. Moulton advised something to this effect: "Let us apply to the question of the ownership of light the same principle which the Legislature has laid down shall be applied to the ownership of land." Where owners of land required for the purpose of a railway refused to sell their land, the Legislature stepped in and told them they must not stand in the way of public works of utility and improvement, but they must sell the land at a reasonable price, *plus* some compensation for compulsory sale. Such a procedure with regard to light would be extremely valuable and would simplify the matter enormously. Another suggestion of Mr. Fletcher Moulton's appealed to them all—viz. that an architect assessor should be appointed to assist the Court, in the same way that the Trinity Masters assisted the Admiralty Court. In reading the Papers so well placed before them in the JOURNAL one could not but be impressed with the strange futility of the valuable work of the Science Committee on this subject. From 1881 to 1894 the question was dealt with by one committee and another, and the only result apparently was to place a document in the hands of the County Council, and then allow the matter to drop altogether. He did not think that the Institute had done wisely in going to the County Council and simply asking them to adopt their suggestions in their Bill. The result was that no notice was taken of them. He was not in favour either of going to the Surveyors' Institution. The matter was essentially one for the Institute to carry through, and there was no reason why it should not be dealt with entirely by the Institute. He would say, let the Council carefully consider the suggestion brought before them by Mr. Brodie, and bring a report before the general body for consideration and adoption. Then the Council itself should promote a Bill to achieve the important objects they desired to bring about.

MR. E. W. HUDSON [*A.*] thought the Meeting would be agreed as to the desirability of stopping undue obstruction and extortionate demands by dominant owners upon persons seeking to develop their land or extend their buildings. Easements had been secured in many cases through the *laches* of former owners in neglecting to block windows overlooking land which at that date had no great value. But in seeking this desideratum it must be remembered that accomplished facts must be taken into account, and their effects were difficult to overrule. The trend of the opinions they had listened to seemed to be for substitution of injunctions by compensation in money, or by planning specially and giving reflected light in mitigation of interference. He agreed with that entirely as a general rule. In assessing compensation it might be just to take the manner of acquisition to some extent into account, on the principle that circumstances alter cases, rather than permit precedents to weigh so heavily. He protested against the sweeping term "blackmailing" as inapplicable universally to these cases. Blackmailing supposed a demand made entirely *ultra licitum* and in defiance of the law. But the law protected easements acquired by undisturbed user, and he thought properly so, *e.g.* in such cases as were mentioned by Mr. Hall. It was not alone in cases of light and air that people sought to get more for their property or rights than they were worth, and one of the great difficulties in adjudicating claims was the conflicting evidence of value or loss by interference given by expert witnesses. Models were most useful, and he understood that the objection lay in the way they were usually looked at—from above rather than in a level position. Infringements now were carefully watched, but in former times rights had been acquired to such an extent that he had sometimes thought it better to quietly arrange for the purchase of the adjoining house rather than attempt negotiation in regard to infringement as desired, or risk injunction. There were cases in towns where each house in a terrace built at one time had windows in the back additions on the boundary, and were lighted

from adjacent gardens, and he did not think it fair that rights given by original leases (transferred later to different lessees or freeholders) should be lost within the twenty-year limit by any one extending his main building so as to block his neighbour's. With a consenting freeholder the usual clause as to not altering buildings would not be any protection. This, he thought, was a case for an injunction. *Caveat emptor* was not a satisfactory answer. Was it not acknowledged that in dealing with one's own property no injury must be inflicted on another's? Could they ask the Legislature for new laws with retrospective effect? He submitted that rights actually acquired should not be forfeited, but it was a moot point whether those in course only of acquisition should be estopped. The subject bristled with difficulties, as the many previous deliberations at the Institute showed. He hoped the wish to do something definite now might end in fruition. He felt strongly that the Surveyors' Institution should be asked to co-operate to the laudable end in view, whether it be by new legislative enactments or, as some might think sufficient, by a less narrow administration of those existing, and with less regard to iron-bound precedent.

Mr. W. M. FAWCETT, *Vice-President*, said that where a man was actually the owner of a right of light it could hardly be expected that the Legislature would take away that right. The Legislature, however, might be asked to enact that in the future no fresh rights to light should be acquired by existing buildings, and none should accrue by prescription to new buildings. In course of time the old rights would gradually pass away, as the buildings possessing them were pulled down, or were so altered as to have entirely new lights. Some mode of procedure by arbitration for existing rights might be devised, but it would be hopeless to lay down any definite rules as to angles, &c. The cases varied so greatly that only very broad principles would be applied.

Professor KERR [*F.*] said that the very great detail in which the subject had been discussed showed how extremely difficult it was to deal practically with the matter. The principle which lay at the root of the trouble was peculiar only to England, for it did not exist in Scotland or Ireland, or the United States, or indeed in any other country in the world. The principle of the law was that as light is so extremely essential, especially in crowded neighbourhoods, people shall not interfere with each other's use of it. It was an abstract principle of English common sense, and was nowhere rigidly defined. The language of the Prescription Act went no further than this, and might be interpreted in many different ways. [In proof of this, the Professor quoted dicta of two eminent Judges in light and air cases, one tried some thirty or forty years ago, and the other quite recently, which seemed to show that the construction their Lordships placed upon the Act admitted principles as wide as the poles asunder.] Although as architects they had the greatest objection to say anything about the lawyers, it must be remembered that lawyers were continually shifting their ground in law. The times changed, the circumstances of property changed, and architects must change also, but whether they could be satisfied with the natural development and change of the law was another matter. As for getting Parliament to legislate specially upon ancient lights, they might exert themselves to the utmost, but he ventured most respectfully to say that they would never succeed in inducing Parliament to take the matter up. That was why Professor Roger Smith's Committee had failed, though no man was better qualified than he to arrive at an amicable and practicable result. But the present meeting was called for the purpose of finding some way out of the difficulty. Suppose, then, that the Institute were to take upon themselves the business of adjudication on questions of this kind; suppose they authorised their Council to be a Council of Conciliation; and suppose that on a case coming before them they gave a decision—which of course would be a practical decision and an architect's decision, not a lawyer's decision—would any one be bold enough to take that decision to a Court of Law? He did not say how this suggestion could be carried out, but it was one which had not been made before. Then there was another plan. The County Council might be urged to make by-laws bearing indirectly upon questions of ancient lights. That body, if it could be induced to undertake the work, might be relied upon to frame such regulations with a single eye to doing justice and with a desire to serve the public at large. With regard to the question always asked by architects—viz. as to the amount of light which had been obstructed—his son (Mr. H. N. Kerr) had prepared some notes, illustrated by a diagram [p. 311], and by a glass model showing the actual percentage of an obstruction [see pp. 311–12]. This was discussed many years ago, and Mr. E. W. Tarn, a mathematical member, had been good enough to determine for the Institute the exact relative values of the units of sky area, and those data had never been contradicted. An examination of the model would show any person how to determine with perfect precision the percentage of light obstruction. He cordially supported the principle of Mr. Brodie's proposal, but it might be found a matter of difficulty to carry it out in detail. From his own experience in a crowded neighbourhood there was nothing more detestable in connection with an architect's business than the way in which blackmail was levied. The term had been objected to, but blackmail it was, and no milder term could be applied to it. In many cases it was nonsense to claim that rights of

light would be interfered with; but the fact of its being alleged often brought about the ruin of a building. He thought that the Judges would be on their side more than they supposed as regards the application of the general principle; but he would not recommend them to go to Parliament. If Mr. Blashill and the gentlemen who piloted the Building Act through the Houses of Parliament would tell them some of the incidents of the operation they would say nothing more about legislation. Whatever the Institute chose to do courageously in the interests of good feeling and propriety would have much more effect than any change in the letter of the law. Indeed, the principle was such that he doubted whether it could be changed. The only thing was to administer the law in as practical and inoffensive a manner as possible.

Mr. EDWARD GREENOP [*A.*] regretted that Mr. Fletcher Moulton was not present to put them right on the question of the existing law. They were proposing to ask for an amendment of the law in two respects, according to Mr. Brodie's paper—first, to alter the Prescription Act permitting the acquisition of future rights; and, secondly, to alter the law as regards existing lights. As he understood Mr. Fletcher Moulton, on the second point the law required no alteration whatever. He said that as to injury which had taken place, there were two possible methods of remedy—the remedy by injunction and the remedy by damages. As regards the remedy by injunction, the building having been erected, an injunction necessarily meant pulling the building down, and that was so drastic that the Courts would not grant an injunction except in very serious cases, but would grant damages. As Mr. Moulton put it: "For this purpose, therefore, when, as is usually the case, an injunction is sought, it is necessary to show material injury in order to put an action on its feet at all." That was in the case of injury done. As regards threatened injury, Mr. Moulton said that the Court must act by injunction or not at all, for in such a case the alternative power of giving damages did not exist. But, later on, he spoke of Lord Cairns's Act, of which he said: "I think it was intended to initiate the system of freely dealing with matters of this kind by way of damages rather than injunction." In other words, for the committed injury and for the threatened injury they had at the present moment both remedies—injunction and damages. Therefore he (the speaker) saw no reason whatever for a change of the law, as suggested, to enable the Judge to make it a question of damages and not a question of injunction where injury was threatened. Professor Roger Smith spoke of the Judges being bound by precedent, and giving, therefore, only the injunction remedy and not the damages remedy; but he could not see that it was a question of precedent. It was a question of will—a question of lukewarmness on the part of the Judges, and Mr. Strahan's observations went forcibly to show that. Mr. Strahan said that "the intention of Lord Cairns's Act was to give the Court a discretion, and the decisions since the passing of the Act seemed to acknowledge that there was that discretion; but, as Mr. Fletcher Moulton said, the Courts were loth to adjudicate on what they felt themselves utterly incompetent to deal with." The fact seemed to be that the law existed, but the Judges did not exercise it, apparently because of the uncertainty induced by conflicting evidence and the unscrupulous statements made by expert witnesses on both sides. Mr. Douglass Mathews practically said the same in his Paper, and it seemed to be a question of altering the law only so far as the acquirement of future rights by the Prescription Act was concerned. Would it be possible for the Institute to approach Her Majesty's Judges and represent to them the great evils which existed, so that they might refrain from issuing injunctions except in the most flagrant cases, where irreparable damage would be done? If they were going to the Surveyors' Institution to get their co-operation in bringing about an amendment of the law in the manner suggested by the Resolution, they should make it clear that they were only referring to the acquirement of rights under the Prescription Act, and that they were not seeking to amend the law, which was sufficient, but which worked badly only because of its abuse by members of their own profession.

Mr. J. DOUGLASS MATHEWS [*F.*], speaking as Chairman and on behalf of the Practice Committee, said he was exceedingly glad that the results of the steps they had taken had been so far satisfactory, as the Meeting appeared to be almost unanimous that some alteration in the law was needed. He must point out to the previous speaker that to have any change in the law of ancient lights there must needs be an alteration in the Prescription Act. As regards the diverse opinions of Judges which had been mentioned, although there were many decisions there was scarcely one case which formed an actual precedent for another; so a hard and fast line was absolutely impossible. As to the suggestion that certain principles should be laid down, it was absolutely impossible to do this, because every case had its own special circumstances, and those circumstances must be taken into account in adjusting differences. A strong point in the Report of the Committee was—that whether it be the third surveyor, or the umpire, or the Court of Appeal, whoever was adjudicating should have the opportunity of visiting the site and noting all the circumstances, and not having to depend upon drawings or models. In reference to that ugly word "blackmail," Mr. Hudson seemed to have the idea that the term was intended to apply in every case where a man defended his right. That was altogether a wrong notion. An owner was perfectly justified in protecting his right, and if

he got moderate compensation no one could find fault. But if he had the whip hand and insisted upon having £500 for what was not worth £50, in that case there could be no doubt that the term "blackmail" applied. One speaker had objected to the Surveyors' Institution being invited to co-operate in this matter. He would explain that the Practice Committee thought it would be desirable to enlist the sympathies of the Surveyors' Institution for two reasons—because it was a large body, comprising representatives of property in every shape and form, and because the need of an alteration in the law had been before that Institution upon one or two occasions, and they felt strongly upon it. The Surveyors' Institution also included a large number of eminent barristers and solicitors, and their assistance might be of great advantage to the Institute in dealing with legal points of the matter. In answer to Professor Kerr's suggestion as to the County Council making by-laws, he would point out that this was not a matter which belonged entirely to London—the whole country was concerned. Light and air questions, which a few years ago were almost confined to London, were now springing up all over the country, and especially in large cities and towns. His opinion was that the matter was far too important to be dealt with by ordinary by-laws. He trusted that the Resolution would be agreed to, and that some action would be taken by the Institute which would bring the matter to the front. Doubtless they would meet with difficulties in obtaining a new Act; but if they could not get the law altered at any rate the discussion would, he felt sure, be advantageous to the profession, and they would probably be able to settle many cases outside the Courts that were now settled or attempted to be settled inside.

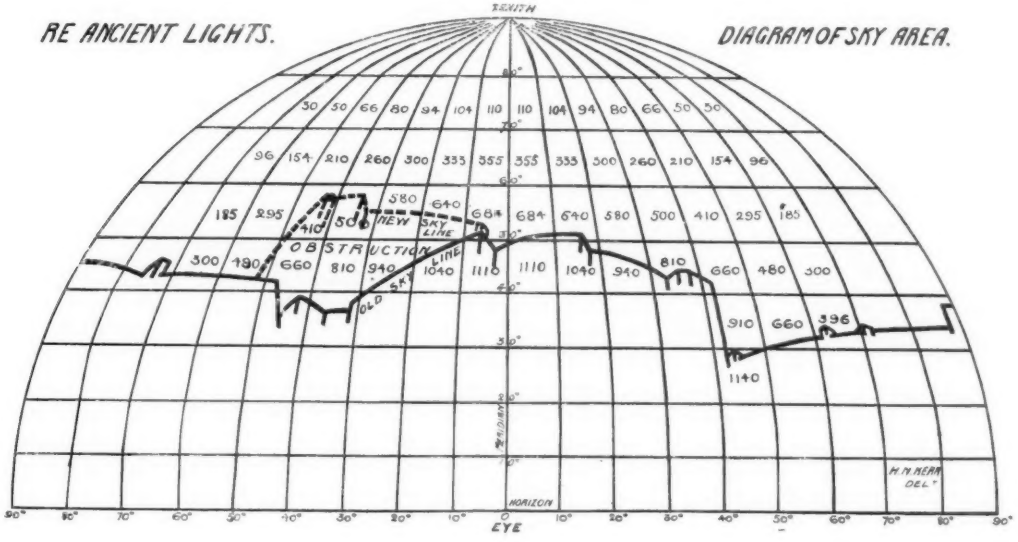
The PRESIDENT remarked that with reference to seeking the co-operation of the Surveyors' Institution he personally was of opinion that the influence of that body would assist very materially in settling the question. Many of its members were men of great experience in these matters, and their present President had served on the Institute Council for many years.

The Resolution was then put to the meeting and carried unanimously.

The PRESIDENT said that the matter seemed to have become narrowed down to one or two points. They could not possibly interfere with present rights of light; they wanted some better procedure for deciding questions that arose under the present law; and they wanted to prevent the acquisition of future rights of light as far as possible. Such matters could only be dealt with by experts, and the best plan would be for the Council to select some such Committee as he had suggested at the commencement. The matter would be considered by the Council at a very early date, and he hoped that before long they should have something practical to lay before the general body.

The following are the notes referred to in Professor Kerr's remarks as having been prepared by his son, Mr. H. N. Kerr, to show a process of determining the amount of light obstructed from a certain area:—

The object of a diagram of sky in a case of ancient lights is to determine what percentage of the amount of light is being taken away by the new obstruction. The whole expanse of the sky



is taken as being an illuminating vault around the aggrieved window, in the form of a half-hemisphere, and the light in question is taken to be diffused light, the sun being hidden.

A block plan of the surroundings, old and new, of the aggrieved window is first prepared, with the heights of the sky line above the point of sight marked thereon.

As a preliminary measure the half-hemisphere is divided into convenient units—say, 10 degrees by 10 by parallels of latitude and longitude—and the comparative values of these units were determined some years ago with mathematical precision by a member of the Institute, Mr. Wyndham Tarn, whose calculations will be found recorded in the TRANSACTIONS of that date.*

The first step is then to project geometrically on the diagram the old sky line, so as to show the precise area of exposed sky formerly enjoyed by the window. The second step is to project in a similar way the new sky line, so as to show the extent of the encroachment.

It then becomes an easy matter to reckon up the value of the old exposed sky, and to ascertain what percentage of this is covered by the encroachment. Whether this shows a material damage or not is then matter for judgment. As regards the point of sight, it will generally be the centre of the aggrieved window as an average for the whole; but in some circumstances the sill may be taken; or even a point within the room representing the position of a special user, such as a writing desk or the working point of a bench. The form of the diagram may be either rectangular or semi-circular, and a glass model may be useful for explanation. H. N. KERR.

Referring to the Papers on Ancient Lights read on the 19th March, Mr. Henry Lovegrove [*A.*] writes:—

I am glad to support the vote of thanks to the three gentlemen who have so kindly taken the trouble to write such concise and practical papers on the vexed question of right to light and air.

The eminent Queen's Counsel and scientist Mr. Moulton has at the outset informed us that right of light is the proper title of the subject, and it is strange that much ignorance on the matter should exist. Only last week I had complaints that a building in course of erection in my district was obstructing the light and causing a serious diminution of air. I told the parties that such matters were not embraced by the London Building Act, and advised them to let the matter drop. The building was at least sixty feet away from the complainants' windows, a distance which affords very fair breathing space for the rear of a house in London.

The most curious case within my knowledge is that of a man who was successful in an action to prevent injury to his light for an irregular wooden shed in which herrings were prepared for curing.

Mr. Mathews has ably sketched out the various kinds of objections made when anybody begins to build, but he omitted to mention that as soon as the excavations are commenced most of the houses within a reasonable distance are decorated with boards bearing the legend "Ancient Lights," as if the exhibition of the board had any legal bearing on the rights of the parties.

Mr. Mathews refers to the labours of the Science Committee (of which I was Secretary) a few years ago. The members agreed that something definite should be done, and they hoped that their Report might become the basis of legislation; but many, including myself, feared that with so many lawyers in the House of Commons there was little prospect of getting an Act passed.

I am inclined to think that all matters of injury to light could be settled by such a Tribunal as that appointed under the Building Act. The hindrances to building on certain sites are great, and a hardship to owners. I know of an important building, which could have been completed in, say, four months, stand over for two years, owing to successive actions by adjoining owners, and many a small and unimportant window has ruined a good building.

Mr. Beresford Pite has carefully explained the proposals of the Science Committee in 1893 and the important suggestion made by Professor Roger Smith. The objection to the appointment of three surveyors would be met by the elected Tribunal, which includes a representative of the Bar. The concluding pages of Mr. Pite's paper should be carefully read and considered by members of the Institute who desire to plan their buildings to meet their clients' views and to avoid having their elevations cut off in such a manner as to destroy the effect of the façade.

The late William James Anderson [*A.*]

The untimely death of Mr. William J. Anderson, at the age of thirty-six, is a loss not only to the profession of which he gave certain promise of becoming a brilliant ornament, but to the larger world interested in the knowledge and appreciation of architecture. As a practising architect, as a teacher of the art, as a writer concerning it, his work may be said to have but just commenced; but already in all three directions he showed himself to be endowed with marked ability. Only those who had the opportunity of coming in close touch with him, either as co-worker or pupil, could appreciate the value of his work in the first two directions; in the last, his book, *The Architecture of the Renaissance in Italy*, published first in 1896 and reissued in greatly improved form as a second edition some eighteen months since,

* "On the Admeasurement of Sky in Cases of Light."—TRANSACTIONS 1869–70, p. 160.

brought him speedy recognition on the part of an infinitely wider circle both in this country and America. It was the more to his credit that he enjoyed no special opportunities of education beyond such as were offered to all in his earlier years, office routine and private reading, and infinitely less than is within the reach of most learners in the art to-day. His apprenticeship was served with Mr. Gillespie, of Saint Andrews; from there he passed to an office in Dundee and ultimately to Glasgow, where he worked as draughtsman successively with Mr. T. L. Watson and Mr. William Leiper. He commenced practice on his own account in 1892. About this time also his first book, *Architectural Studies in Italy*, was published, consisting of an interesting collection of measured drawings and sketches made during his tour in that country as holder of the "Alexander Thomson Memorial Studentship." In it is manifested a fine discrimination in the selection of subjects of study, and an early appreciation of the refined work of Peruzzi, his favourite master throughout, together with the straightforwardness and grip which always characterised his work as a draughtsman.

In 1894 he was appointed Director of the architectural department of the Glasgow School of Art, a post which he was peculiarly suited to fill with acceptance, and in which his influence for good was increasingly felt from year to year. To his work at the school he devoted himself without stint; learned photography that he might furnish himself with the slides that he felt his lectures required for illustrations, and, besides teaching, supervising, and lecturing, personally conducted his students during the Easter and other holidays on excursions extending for three or four days to one or other of the many places of architectural interest throughout the country.

From his first course of lectures grew his better known work on Italian Renaissance architecture, already referred to, which having been but recently reviewed in these pages need not now be further commented on. With a similar origin a second book on Greek and Roman architecture was taken in hand, and to a large extent was ready for the press at the time of his death; while a third, on French architecture, was projected and partly written. It is to be hoped that arrangements may yet be made for carrying through one, if not both, of these works.

Teaching and writing (both books and press work) naturally limited very materially the time which would otherwise have been devoted to the ordinary practice of his profession. Mr. Anderson never had the opportunity of carrying out any very large or monumental works, but notwithstanding his other labours he was steadily developing a connection, and all his work, whether in stone and lime, or in decoration, of which he did a considerable amount, was marked by dignity of conception, combined with refinement in detail. Besides being an Associate of the Royal Institute of British Architects, Mr. Anderson was an active worker for many years and for two terms President of the Glasgow Architectural Association. He leaves a young widow and infant son, with whom much sympathy is felt by his many admirers and friends.

Glasgow. ALEXANDER W. PATERSON.

MINUTES. XII.

At an Adjourned General Meeting, held Monday, 9th April 1900, at 8 p.m., Mr. Wm. Emerson, *President*, in the Chair, with 18 Fellows (including 8 members of the Council), 15 Associates (including 1 member of the Council), and visitors, the Minutes of the Meeting held Monday, 2nd April 1900 (*ante*, p. 284), were taken as read and signed as correct.

The decease was announced of Signor Michele Ruggiero [*Hon. Corr. M. Rome*], and it was agreed that a letter of condolence should be sent to his relatives.

The discussion on the question of Reform in the Law of Ancient Lights, adjourned from the Meeting of the 19th March, having been resumed, and communications thereon read from Mr. T. M. Rickman [*A.*], President of the Surveyors' Institution, and Mr. Arthur Cates, a resolution urging the Council to take action in the matter was moved by Mr. C. H. Brodie, on behalf of the Practice Standing Committee, and seconded by Professor T. Roger Smith, whereupon, after further discussion, it was

> RESOLVED, That this Meeting considers an alteration in the Law of Ancient Lights to be urgently needed, and requests the Council to put itself into communication with the Council of the Surveyors' Institution without delay, with a view to the co-operation of that body in taking such steps as may be necessary to secure an amendment.

The proceedings then closed, and the Meeting separated at 10.30 p.m.

At the Twelfth General Meeting (Ordinary) of the Session 1899–1900, held Monday, 23rd April 1900, at 8 p.m., the President, Mr. Wm. Emerson, in the Chair, with 12 Fellows (including 5 members of the Council), 8 Associates, and visitors, the Minutes of the Meeting held 9th April were taken as read and signed as correct.

The decease was announced of Benjamin Edmund Ferrey, F.S.A. [*F.*]

The following Fellow attending for the first time since his election was formally admitted and signed the Register—viz. William White Cooper, M.A. Cantab., Diocesan Architect to the Diocese of Grahamstown, Cape Colony.

The Hon. Secretary having drawn attention to a portrait of the late Mr. Reynolds Rowe, *Fellow*, which had been presented by his widow, moved, and it was thereupon resolved, that the thanks of the Institute be accorded to Mrs. Rowe for her kind donation.

The results were announced of the Statutory Examination for the Office of District Surveyor, held by the Institute on the 19th and 20th April [see p. 299].

A Paper on the PROTECTION OF PUBLIC BUILDINGS FROM LIGHTNING, by Mr. Killingworth Hedges, having been read by the author and illustrated by lantern-views, a discussion ensued, in the course of which a further series of lantern-views were shown by Mr. Wm. Marriott, Secretary of the Royal Meteorological Society, in illustration of his remarks on phenomena observable in lightning flashes and thunderstorms, whereupon the thanks of the Meeting were accorded to both gentlemen by acclamation.

The proceedings then closed, and the Meeting separated at 10.10 p.m.

REVIEWS.

ST. PAUL'S CATHEDRAL.

The Cathedral Church of St. Paul. An account of the Old and New Buildings with a short Historical Sketch. By the Rev. Arthur Dimock, M.A., Rector of Wetherden, Suffolk. 8o. *Lond.* 1900. *Price* 1s. 6d. [*Messrs. George Bell and Sons, York Street, Covent Garden.*]

It is perhaps fitting, in a country so rich in mediæval cathedrals and abbeys, that some nineteen of them should be dealt with in these illustrated handbooks before the Metropolitan masterpiece of Sir Christopher Wren takes its turn. Perhaps, too, on the principle that we see less of what is passing close to our eyes, they have commissioned for the task the rector of a mid-Suffolk village, and the selection is justified by the result.

The 150 pages of the compilation are made up of one-third history of the see and Old St. Paul's, one-third description of the exterior of the existing fabric, and one-third that of the interior of the same. Clear ground plans of both buildings are given, and the book is illustrated with thirty-seven "process" views of both structures, the most novel reproduction being that of an elevation which received the royal warrant, but, fortunately, was not adhered to.

THE NAVE OF OLD ST. PAUL'S.
After Hollar.

Appendices give a list of the bishops from Restitutus, A.D. 314, to the present day, and a table of areas of some of the largest churches in Christendom, St. Paul's taking fifth place.

History.—In Chapters I., II., and III., the salient points in the history of the see, and early buildings are touched upon; from the rude fane of Restitutus, through the rebuildings by or through Augustine, Lanfranc, Richard de Belmeis, and others down to 1666; their vicissitudes and accidents by fire, and the ravages of time duly related. Reference is made to the institution of archdeaconries, the grades of chancellors, precentors and treasurers; the creation of the prebends, chapter, petty canons, chantries, &c.

The rites and services erstwhile appointed to be performed, the *Te Deums* for victory, the fights for church freedom, the efforts of the Reformers, the contest between Romanist and Protestant, and the final desecration of the Cathedral under the Stuarts, when the nave was the resort of rogues and thieves, and became

> "The land's epitome—the general mart of
> All famous lies,"

receive brief notice. Then follow Inigo Jones's repairs and additions in heavy classic stonework, Sir Paul Pindar's restoration of the choir-screen—one dreads to think what that meant—the Cromwellian desecration, the Plague, and the Great Fire.

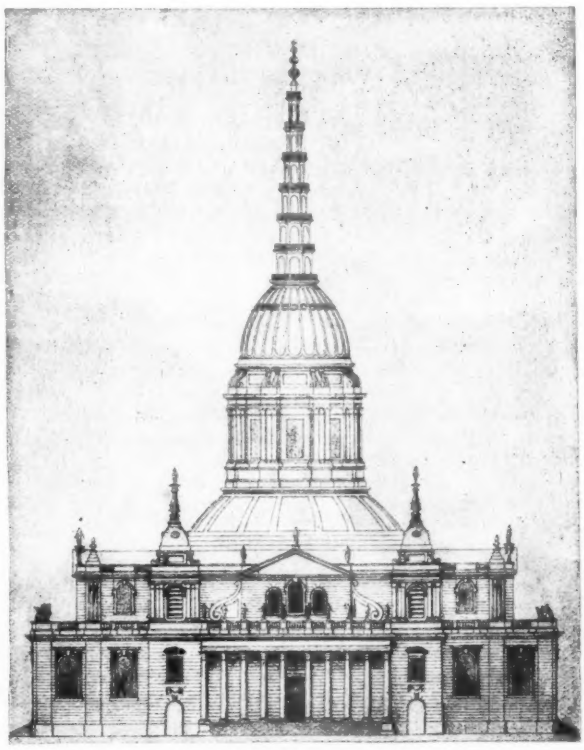
If Old St. Paul's had but been saved! What scope for the work of the nineteenth century Gothic revivalist! Westminster would have had a formidable rival, and London possessed a noble Norman nave, while St. Bartholomew's lost its pre-eminence for remains of that period.

Exterior.—In Chapters IV. and V., comprehending the central division of the book, Wren's several designs for the rebuilding are illustrated. We have first the better-known Greek Cross arrangement, practically without choir; then the extended plan with minor dome added to the West. This being rejected, a heavy design known as the "Warrant" design received the king's approval. It resembled the destroyed work of Jones, and it is matter of satisfaction it was not carried out, although in perspective the grouping would have been less objectionable than in the elevation given from a drawing in All Souls' College, Oxford. Its lines resemble the main front of the Pantheon at Rome, with its dome surmounted by a drum, and the cupola of the "Invalides" at Paris superimposed, and the whole topped by the spire of St. Bride's, Fleet Street!

Looking at the completed building, few will regret that this design was so widely departed from, notwithstanding the order that it was "only

to be departed from in the way of ornament." In spite of the restrictions and vexatious interference to which Wren was subjected, he took a licence in this respect which few modern architects would take after a design had been approved. In the lesser matter of the addition of a balustrade to the cornice which he had not intended, he was, in spite of protest, forced to submit. The retention of half his humble salary of £200 a year to induce him to hurry on the building was but one of the indignities heaped upon him.

Referring to a footnote on p. 68, one must join issue with the author as to making Wren's remarks upon architecture "compulsory for every student." One could not now, after the teachings of Pugin, Ruskin, and Viollet-le-Duc, go back to dogmas such as "Gothick buttresses are all ill - favoured ;" "Almost all the cathedrals of the Gothick Form are weak and defective in the Poise of the Vault of the Aile ;" "Affectation of Height and Grandeur, though without Regularity and good Proportion in most of them," &c. The settlements he complains of in such structures are not the fault of want of scientific skill, but unstable foundations,* and lack of good material ; and in his own building here, the former cause was answerable for serious settlements, but a positive benefit accrued from the latter, inasmuch as want of large blocks of stone saved us from Brobdingnagian columns, and gave us instead coupled columns of graceful proportion. A section of the dome as executed is given in this chapter, showing false ceiling within, and timber shell without ; now, we hope, rendered fire-resisting, if not fire-proof.



THE "WARRANT" DESIGN.

From a drawing in All Souls' College, Oxford. Reproduced from Blomfield's "Renaissance Architecture."

The vexed question of the false curtain-wall is met by a *tu quoque* suggestion of the author's, which Wren might have made to any indictment by a mediævalist, viz. a roof at Ely Cathedral was "dropped down" behind the clerestory, leaving a tier of windows through which flying buttresses could be seen. Wren's avowed principle, however, can only be considered as waste of material, besides requiring unnecessary strength of foundation. "I do not add buttresses," he says, "*but I build up the wall so high as by the additional extra weight I establish it as firmly as if I had added buttresses.*" The alteration at Ely is really no answer to a question of principle, being an afterthought to meet altered circumstances. In Chapters VI. and VII. we pass to the interior ; the description is divided into Nave, Dome, Transepts, Choir, Monuments, Crypt, and Library, and these headings into subsections.

The author is doubtful as to what Wren would have said in regard to the introduction of the reredos of Messrs. Bodley and Garner, splendid work though it be. It raised much discussion at the time it was set up, but nothing to that originated by the decoration installed by Sir W. B. Richmond, R.A. As to this the author (like the artist himself) appeals to posterity ; not precisely, however, on the lines of the now famous letter to *The Times*. Sir William makes the mistake of supposing that the only protests and objections emanated from "certain young ladies and gentlemen of the Slade School of Art and elsewhere." No one, so far as the reviewer is aware, and he has attentively followed much that has been said and written, has in the abstract denied that "*good and appropriate decoration* would not be contrary to the wishes of Sir Christopher Wren." "Sermons

* Old St. Paul's was built on loam or brick earth.

in glass" these mosaic decorations undoubtedly are, but they speak in different, if not in uncertain, terms and tones to different auditors. That the process itself is splendid, probably few will deny; but the keynote struck thereby in St. Paul's, many such would only admit into a Byzantine building. In *more quietness* and in *less confidence* would have been its strength, in the humble opinion of those who believe with Ruskin that it should be "a feast where there is nothing redundant, never a sense of gap or blank, nor of a member which could be spared, that the decorator should diffuse the ornament *in due relation over* the whole building, or so concentrate it as never to leave a sense of its having got into knots, for every added order of ornament increases the difficulty of discipline." These experiments of decoration prove this up to the hilt. It was felt that discipline was going by the board when the stencil-work had to be added * to try to keep up the equilibrium of tone so forcibly disturbed by the mosaics. Though the simple chasteness of the choir was gone, the outcry showed the entire "moral character"—to borrow a Ruskinism—of the stone-work must not follow; for ornament is always "*wild to get the bit in its teeth, and rush forth on its own devices.*" Mr. Gilbert, R.A., calls Wren a "sculptor-architect"; and if he thought of using mosaics, "Proutism" would have dominated his design, but so that the chasteness of the interior would not have been, as it were, swamped, but decoration been subservient to architecture, not governing, but governed by it. "I may not say more, I cannot say less." † A view purporting to show Wren's idea for decorating the interior with sculpture was published in 1755. Who shall say the committee have carried out "*Wren's conception* on a large and well-organised scale"?

The Jesus, or properly Liddon, Chapel suffers from want of light, and the beauty of the reredos and altar-piece is lost on most days in cimmerian darkness. To have seen this fine painting by the side of Cima's original in the National Gallery was sufficient to make one accord great praise to the artist, Mr. Anthony de Bree, whose works, though little known to the general public, are to be found in the best private collections in England.

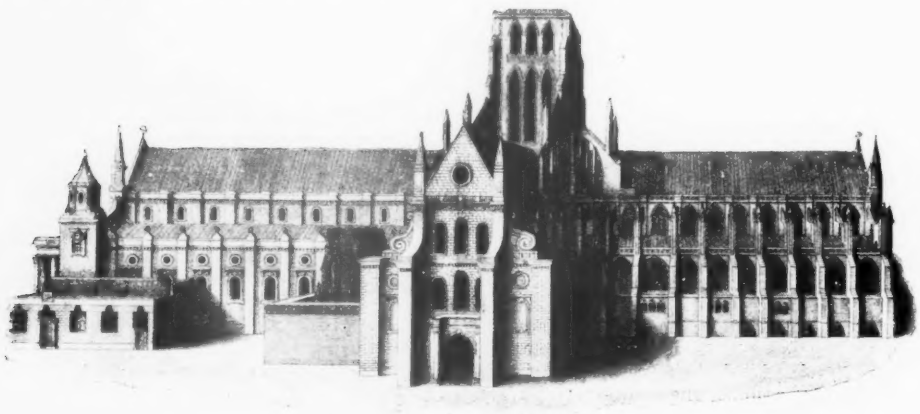
Wren's previous years are dealt with at the beginning of Chap. IV., and noting the few opportunities he had of making himself acquainted with Classic work on the Continent, it is clear that it was no mere compliment that Sprat paid in writing of his "extraordinary genius." The way he "copied in Fancy and Memory" Bernini's design of the Louvre, in a five minutes' reluctant display of it, shows how rapidly he received and retained architectural impressions, and in the words of the author anent St. Paul's, "instead of echoing complaints, it is surely better to be thankful we have one cathedral, situated in the greatest centre of population, in the latter style." "Even so we may end here, and describe this unique and marvellous conception of a man who was not a trained architect, as the finest church of the Renaissance style and epoch"—at all events in the United Kingdom.

A description of the monuments brings this excellent guide-book to a close.

EDW. W. HUDSON.

* This has been stopped through reiterated protests and acknowledged as an experiment. The effects may be seen in contrast in the octagon of the dome.

† Arthur Milman, son of the late Dean, whose wish was "to see such decorations introduced as may give some splendour while they do not disturb the solemnity or exquisite simplicity of the edifice."



SOUTH VIEW OF OLD ST. PAUL'S IN 1658.